

RECREATION MANAGEMENT PLAN
FOR THE
SHELL MANAGEMENT UNIT

PREPARED FOR

PROFESSIONAL DEVELOPMENT PROGRAM FOR OUTDOOR
RECREATION MANAGEMENT
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PROJECT: RECREATION MANAGEMENT PLAN FOR THE SHELL MANAGEMENT UNIT.

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ABSTRACT

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TITLE: RECREATION MANAGEMENT PLAN FOR THE SHELL MANAGEMENT UNIT.

Abstract: The study presents a proposed Recreation Management Plan for the 9,290 acre Shell Management Unit located within the Hume Lake Ranger District, Sequoia National Forest. Current management of the Unit can be improved by intensified efforts in interpretive services, trail management, and development of dispersed recreation sites. Relatively easy access to the area by visitors, pack-stock enthusiasts, and two-wheeled vehicles has increased user conflict, accelerated resource damage, adversely impacted facilities, and deteriorated the quality of the recreation experience. The study incorporates the findings of previously related research in developing recommendations for future management of recreation resources within the Shell Management Unit.

OVERVIEW OF ORGANIZATION

The project report is organized in accordance with the sequence of chapters and content outlined on the next page. Chapter One presents a general introduction to the District followed by study objectives and related parameters. Chapter Two reviews previous research conducted in similar areas with identical problems and its applicability to this study. Chapter Three discusses the procedures utilized in collection and treatment of data. Chapter Four analyzes data and provides a site specific introduction to the Shell Management Unit. Three subsequent sub-parts combine related research with field observations in making specific recommendations regarding interpretive services, trail management, and dispersed recreation site development. Chapter Five provides a summary of procedures, analyses, and conclusions and makes recommendations for implementing study findings. Organization of the project report follows an academic format provided by Clemson University.

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ACKNOWLEDGEMENT

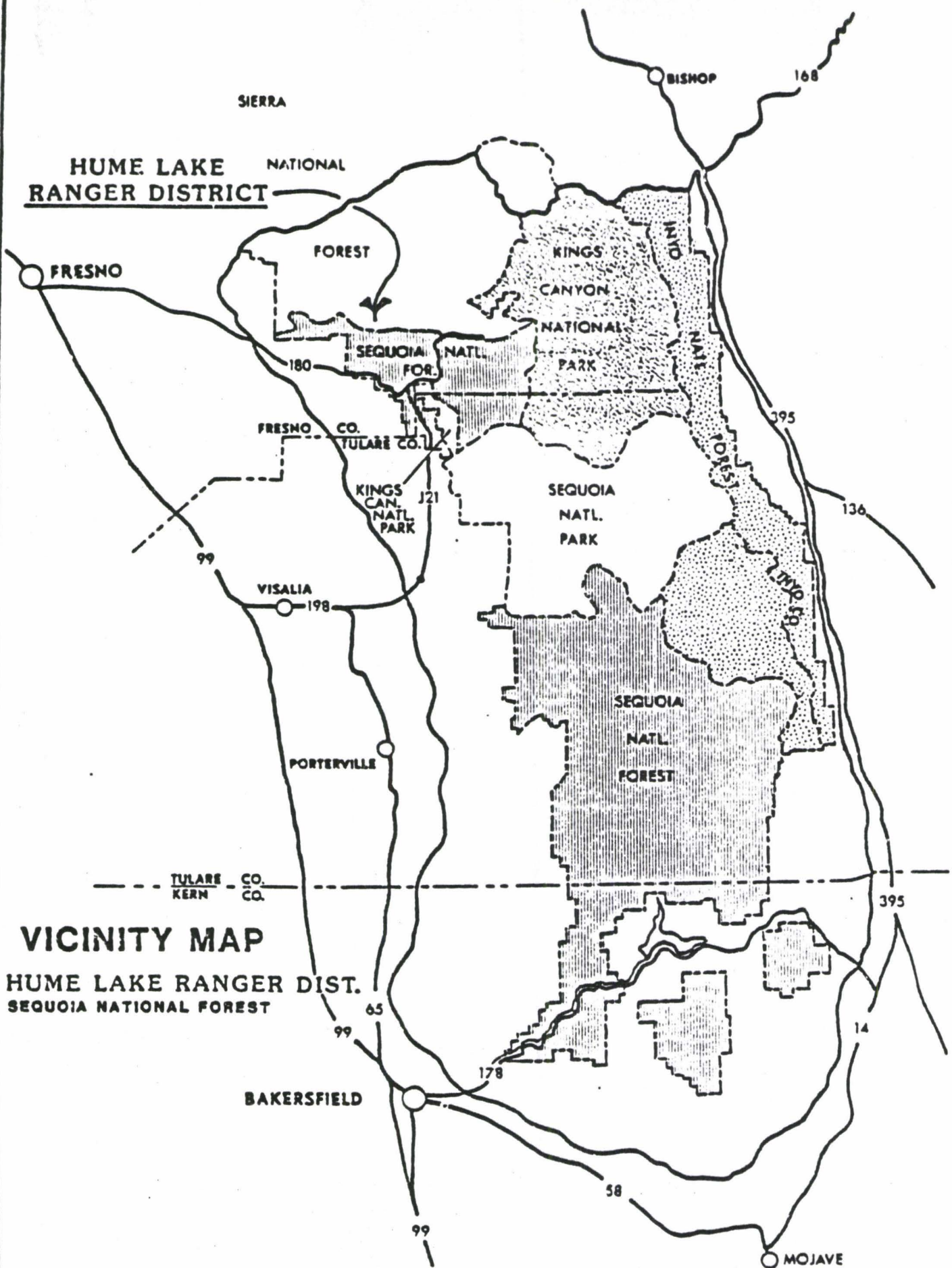
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DEDICATION

This Recreation Management Plan has been developed by Bruce E. Giampaoli as a preliminary step in the future management of recreation resources within the Shell Management Unit. The author recognizes and appreciates the support provided by Norman G. Arseneault, Deputy Forest Supervisor, Mt. Hood National Forest and Bruce A. Waldron, District Ranger, Hume Lake Ranger District, Sequoia National Forest. The author also acknowledges the assistance provided by a competent Forest and District Staff.

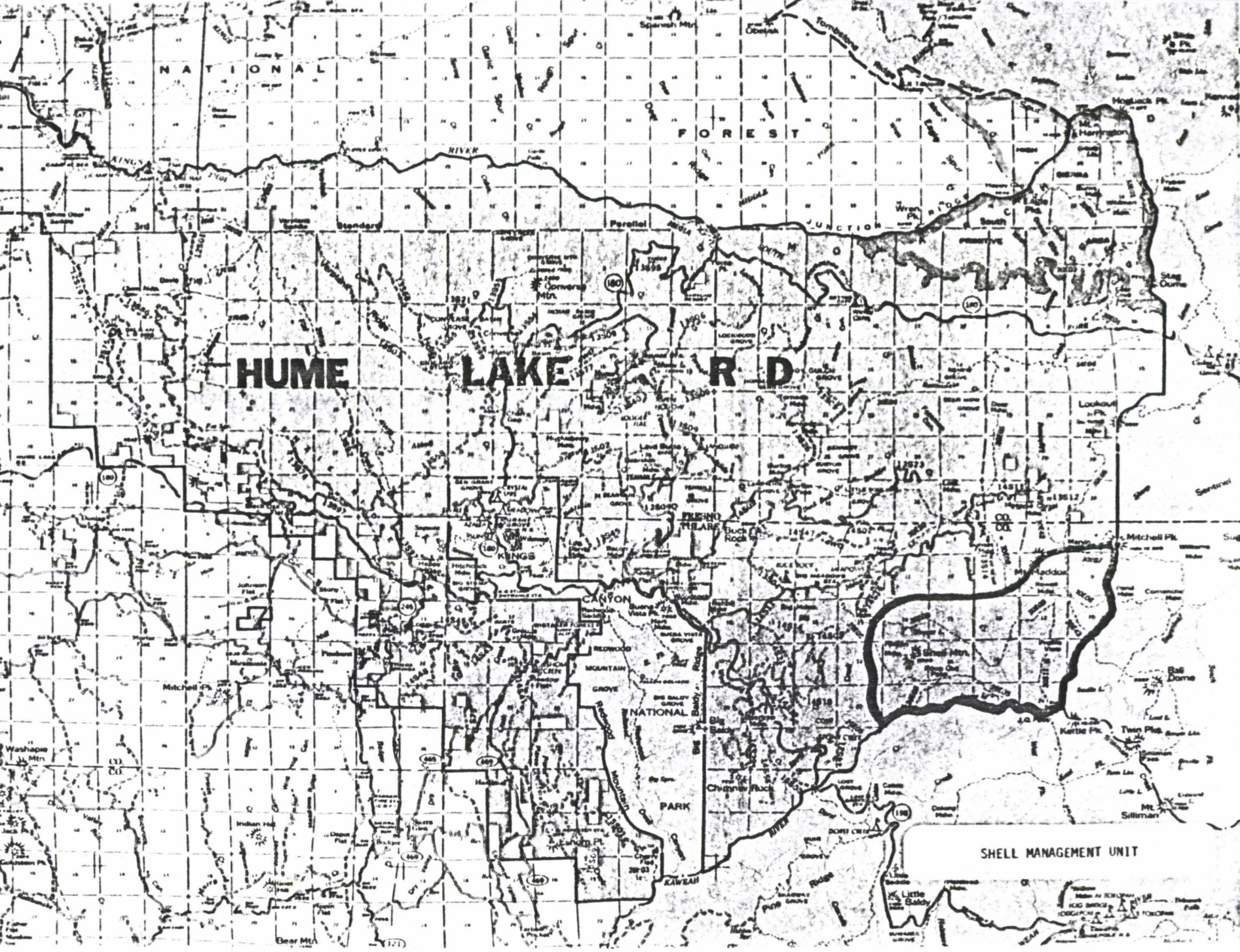
This Project Paper is dedicated to my wife Joyce whose patience and understanding helped immeasurably during those long nights when the midnight oil was burning.

**HUME LAKE
RANGER DISTRICT**



VICINITY MAP

**HUME LAKE RANGER DIST.
SEQUOIA NATIONAL FOREST**



SHELL MANAGEMENT UNIT

SHELL MANAGEMENT UNIT

LEGEND

—	Mitchell Peak Trail	(30E07A)	.9 miles
—	Kanawyer Can Trail	(30E07)	1.2 miles
—	Belle Canyon Trail	(30E43)	1.6 miles
—	J. O. Pass Trail	(30E11)	3.7 miles
—	Stony Creek Trail	(29E06)	3.7 miles
—	Jennie Ellis Trail	(29E05)	7.9 miles
—	Weaver Lake Trail	(30E09)	5.9 miles
—	Rowell Meadow Trail	(30E08)	3.8 miles
—	Marvin Pass Trail	(30E06)	1.1 miles

SEQUOIA

NATIONAL

KINGS

NATIONAL

CHAPTER ONE

INTRODUCTION AND STATEMENT OF THE PROBLEM

INTRODUCTION:

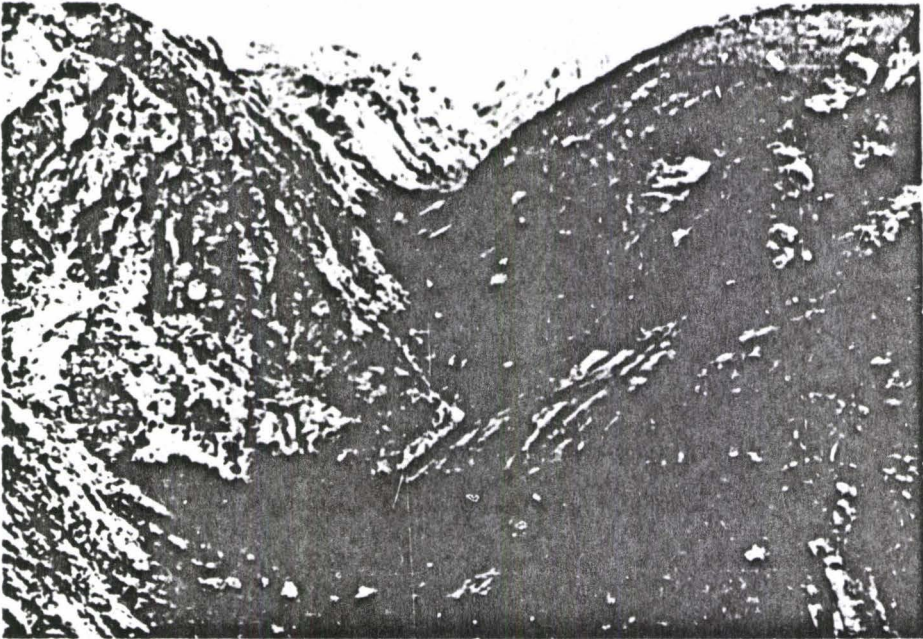
The Sequoia National Forest is located at the southern end of the Sierra Nevada, extending from the Kings River on the north to the Mojave Desert on the south. The eastern boundary is on the Great Western Divide where it joins the Inyo National Forest, and on the west it extends to the foothills of the San Joaquin Valley. Elevations range from one thousand feet in the foothill region to peaks over twelve thousand feet high in the rugged High Sierra country. As a result of glacial action, the high country is dotted with many lakes and mountain meadows. The Sequoia National Forest contains a total of 1,178,807 acres, of which 1,115,636 acres are National Forest lands. There are five Ranger Districts: Hume Lake, Tule River, Hot Springs, Cannell Meadow, and Greenhorn.

The Hume Lake Ranger District, with headquarters at Clingans Junction, is located forty miles east of Fresno, California, on all-weather State Route 180. The District extends 35 miles west to east and 17 miles north to south. Gross acreage is 176,285 acres with 15,276 acres in private ownership. Elevations range from 950 feet at Pine Flat Reservoir at the western edge of the District to 11,081 feet near Hogback Peak in the high country. Average annual precipitation varies

from 18 inches in the foothills to 31 inches at Pinehurst (4,000 feet), to 43 inches at Grant Grove (6,600 feet), with most of the precipitation at Grant Grove and above occurring as snow. Vegetation varies from annual grass woodland in the front country through rich mixed conifer timberland east and north of Grant Grove to dwarfed alpine plants growing within the High Sierra Primitive Area. The Kings Canyon, more than 7,000 feet deep at its deepest point below Spanish Mountain, is a remarkable scenic and geologic phenomenon on the District. Its steep walls, varied colored rocks, and raw dramatic appearance have impressed visitors since its discovery. Soils elsewhere on the District, as in the canyon, are mostly granitic in origin.



Hume Lake - looking north



Kings Canyon - looking east

Old and second growth Giant Sequoias are scattered through the timberland in the moist drainages from about 5,500 to 7,000 feet elevation. The Giant Sequoia groves on the District and in the Grant Grove area were discovered in 1860. A few years later, after the great California floods and drought of 1862-64, which severely damaged the San Joaquin Valley and foothill sheep ranges, sheepherders began moving vast flocks of sheep through the District to graze the high country. About the same time lumbermen began cutting in the Giant Sequoia belt. Extensive logging and milling operations were developed and communities grew at Millwood, Converse, and Hume Lake during the period 1880 to 1920. It was a bustling era, complete with steam donkeys, skidways,

railroads, millponds, multiple arch dam, and a 59 mile flume system.

The resultant destruction of entire groves of these magnificent Sequoias was a terrible loss to our Nation's heritage. Today, only a very few of these giants remain, one of which is the Boole Tree. This Giant Sequoia stands 269 feet high with a circumference of 90 feet and is the largest tree in the National Forest system.



Boole Tree

Public reaction against the indiscriminate early day logging of the Giant Sequoia and overgrazing of the high country by sheep led to the establishment of the Sequoia and General Grant National Parks beginning in 1890 and the designation of the Sierra Forest Reserve in 1893 (Strong, 1967). The Hume Lake District was established in 1908 within the reserve after it was redesignated the Sierra and Sequoia National Forests. As the old-time lumbering industry collapsed during the 1920's because of structure fires and the high cost of harvesting and transporting the large timber, the mill communities decayed and vanished.

The District has since evolved into a well-balanced multidisciplinary program supported by a staff in Business, Fire, Resources, Silviculture, Timber, and a Recreation program consisting of both summer and winter activities. The Recreation Program is complex and highly diversified and includes: cultural resources, whitewater rafting, twenty developed recreation sites, caving, special uses, 200 miles of trail, and management of the proposed Monarch Wilderness Area.

Because the District provides such a diversity of recreation opportunities, it is desirable that specific Recreation Management Plans be utilized in helping managers anticipate and plan for user demands, particularly as they relate to areas where concentrated public recreation use is occurring. One area which has a need for a Recreation

Management Plan is the Shell Management Unit. This important area must be effectively managed due to the diversity of recreation users, potential for user conflicts, and its adjacent boundary with the Kings Canyon National Park.

PROBLEM STATEMENT:

Current public use of the Shell Management Unit by visitors, pack stock enthusiasts, and two-wheeled vehicles is causing accelerated resource damage, adverse impacts to facilities, user conflicts, and deterioration of a quality recreation experience.

HYPOTHESIS:

Current Forest Service research related to backcountry recreation management can help mitigate adverse impacts upon users and physical resources. Research findings can be incorporated into intensified Interpretive Services, Trail Management, and Site Development Plans to reduce negative sociological and physical impacts.

DELIMITATIONS:

The Management Plan will address only that area known as the Shell Management Unit as identified in the Sequoia Land Management Plan. Due to time and weather constraints, the plan does not address every potential or existing recreation conflict, opportunity, or development.

LIMITATIONS:

The Plan does not address or mitigate the impacts of facility development or long range planning on other resources such as Fire, Timber, Watershed, Range, and Wildlife. However, principal members of these respective staffs have provided input into this Recreation Management Plan. The Plan has not been subjected to an Environmental Assessment process, etc. Emphasis will be placed on those areas where visitor conflict and concentrated public recreation use are occurring and how previous research, long range planning and facility development can assist in mitigating these impacts.

OBJECTIVES:

Management objectives for the Shell Management Unit are developed from Wagar's (1964) discussion in managing for carrying capacity, ie.:

- a.) Reduce conflicts among competitive uses.
- b.) Reduce the destructiveness of people.
- c.) Increase the durability of the physical resource.
- d.) Provide increased opportunities for visitor enjoyment.

The objectives of this project paper are to develop Interpretive Services, Trail Management, and Dispersed Recreation Site Development Plans which are compatible with current research and management objectives for the Shell Management Unit.

CHAPTER TWO

REVIEW OF LITERATURE

1. INTRODUCTION TO CARRYING CAPACITY:

Few topics in recreation management are discussed as widely or as loudly as carrying capacity. The term is a perfect example of conventional wisdom: everyone talks about managing our recreation resources within their carrying capacity, but when you get to specifics - how many, what kinds, when, for whom, etc. - the discussion bogs down (Lime and Stankey, 1971). Recreation carrying capacity is not a simple, single, absolute value. There is no fixed figure we can point to for a particular recreation area and say "this is the carrying capacity." The recreation manager must consider a wide range of potential activities, many of which are in conflict with one another.

Recreational carrying capacity is the character of use that can be supported over a specified time by an area developed at a certain level without causing excessive damage to either the physical environment or the experience for the visitor (Lime and Stankey, 1971). Previous research (Wagar, 1964; Lime and Stankey, 1971) has identified three

basic components of carrying capacity: Management objectives; visitor attitudes and perception; and, recreation impact on physical resources.

a.) Management Objectives: There are many possible carrying capacities for a given recreation area. These capacities can be defined only in light of the objectives for the area being studied. Management objectives must consider:

- 1.) The type of recreational opportunities the area itself is going to provide.
- 2.) The recreational opportunities other recreation suppliers in the immediate area provide.

The area could be managed to provide camping in a near-natural setting with a low level of development or the emphasis could be on high-density use with well-developed facilities for both comfort and activities. A person interested in a camping experience in a near-natural setting with few others nearby will not enjoy camping in a state park with many other people camped close by. This is not evidence the area is being used beyond capacity. Rather, the individual's desires are inconsistent with the management objectives for the area.

Although there is a wide range of recreational tastes, certain kinds of activities tend to be associated with one another (Burch, 1964). These "activity aggregates" place certain demands on the resource and relate in certain predictable ways to other users. Thus, region-wide planning may be needed to meet the diversity of recreation tastes. However, "no one recreation supplier need feel obliged to meet all demands. Each public agency or private owner could aim clearly at a part of the demand and refer people who want something more, less, or different to a more appropriate area" (Lucas, 1963).

"By making sure that a full range of opportunities exists (regardless of the agency or organization that provides them), we will then be in a position to match visitor needs with opportunities rather than trying to develop recreation areas for the mythical average user" (Shafer, 1969). Attempting to manage any location for its carrying capacity will be an exercise in futility without definite objectives.

- b.) Visitor Attitudes and Perceptions: What the recreationist perceives as acceptable or desirable may be quite different from what the manager perceives (Stone and Taves, 1958; Lucas, 1964; Hendee and Harris, 1970). Visitor attitudes are valuable in formulating decisions. They help define the

spectrum of opportunities wanted, and the mix of these opportunities; and, they shed light on how visitors might respond to specific management actions. Knowing who may oppose a given management action and taking measures to explain why their preferences cannot be met may be as important as deciding for whom the area will be managed (Lime, 1971a).

- c.) Recreation Impact on Physical Resources: The resistance of an area's resources to use is an important constraint on carrying capacity. Knowing how the resource is affected by various levels and types of use does not by itself tell the manager what is an acceptable amount of change to permit. There are many possible standards of acceptable change that the manager could employ. The objectives for the area are the controlling factors for these standards.

The manager can implement various techniques to harden the site, i.e. irrigate, fertilize, rotate use, or pave, thereby making the site more resistant to change. But the action the manager takes is based on how change relates to management objectives rather than directly on change itself. In an activity-oriented, high-density-use campground, the manager could use a variety of techniques to offset problems of resource damage, i.e. paving or planting hardy species.

However, in a campground where the objective is to provide a camping opportunity in a fairly natural setting, the amount of resource change permissible would be comparatively small. To maintain the natural setting, the manager might have to resort to restrictions on use, such as numbers of people, kind of use, etc., rather than on techniques that "harden" the site (Lime and Stankey, 1971).

What the manager needs to know about recreational impacts upon the resource is:

- a.) The character and rate of change that will occur under specific levels and types of use.
- b.) How the predicted change in the physical environment relates to the management objectives for the area.

Wildlife populations, including the large ungulates and carnivores as well as smaller species of mammals and birds, are affected by back-country recreation use, particularly when this use is concentrated in critical habitat areas. Recreation impacts upon wildlife are particularly significant where the species have a limited habitat in which it can survive and/or a habitat that is attractive to recreationists.

Although typical wilderness uses such as backpacking probably have a fairly brief and relatively minor impact on wildlife, increases in this use will raise the level of harassment on wildlife populations (Hendee, Stankey, Lucas 1978).

Unfortunately, the best wildlife habitat is also usually the choicest location for recreationists to congregate and where facilities such as campsites and trails are located. Critical habitats (waterholes, streams, lakes, winter ranges, etc.) need protection from human intruders. An important relationship exists between campsite location and non-restricted movement by wildlife at high alpine and isolated areas such as Jennie and Weaver Lakes. The problem is further compounded by improper storage of food, inadequate garbage disposal, excessive dispersal of campsites, use of cosmetics, and not leaving pets at home (Ream, 1980). Shoreline vegetation should be left to act as a partial screen or buffer between campsites and water and to protect the soil by dispersing use at the water's edge. Shoreline vegetation would also provide natural habitat for wildlife (Burch, 1964). Screening the visibility of people apparently makes some animals more secure. However, animals are sometimes more at ease when they have a clear line of sight of potential danger (Ream, 1980).

For people and wildlife to coexist, people must behave in a manner acceptable to animals (and vice versa). There is a limit to how many disturbances per unit time (even nonaggressive disturbances) animals will tolerate. This tolerance will vary with each local population, but it is a very important criterion to establish if wild animals are desired in an area (Ream, 1980).

II. INTRODUCTION TO INTERPRETIVE SERVICES:

The effect of Interpretive Services on backcountry use distributions can range from none to substantial. Information must be used in particular ways to be a useful management tool (Lucas, 1981):

- a.) Information must be geared to management objectives. Managers must decide if they want to bring about a general redistribution (from heavy to light use areas), or site-specific redistribution (probably a more appropriate objective), or to help visitors match their desires and experiences better (a very appropriate objective and probably the easiest to achieve). Each objective or group of objectives needs to guide the design and conduct of the information campaign.
- b.) The information must be delivered to a large proportion of visitors.
- c.) The information must be delivered early enough in the recreation location choice process to be of use to visitors. After people have arrived at an access point, it is too late to influence that trip, although later trips might be affected.

- d.) Information provided should cover a variety of attributes of the environmental, use, and managerial settings. Different visitors have different objectives and will respond to varying types of information in different ways.
- e.) Considerable detail seems to be desired and perhaps necessary to compete with previous knowledge and advice of friends. More detailed information also may improve the credibility of information.
- f.) An information campaign cannot rely entirely upon written material. Other research (Fazio, 1979) has shown that brochures are often a much less important channel of communication than face-to-face communication. In the North Carolina Wilderness (Roggenbuck and Berrier, 1980), personal contact was no more effective than a brochure alone for total use, but it did increase effectiveness with some types of visitors.
- g.) Some ethical issues of truth in information campaigns need to be faced. Some overused areas may, in fact, be very attractive with good fishing, easy trails, and so on. Certainly, false information can never be used, but ethical guidelines are less clear on issues of selectivity, completeness, and emphasis.

- h.) Finally, managers must be sensitive to the danger of providing too much detailed information and taking away the sense of exploration and discovery that contributes to recreational experiences for many people.

Communication and education are promising tools for managing recreation use. They are well worth the careful, skillful effort required for them to help achieve objectives of protecting resources and providing opportunities for recreational experiences (Lucas, 1981).

III. INTRODUCTION TO TRAIL MANAGEMENT:

In a study by Weaver, Dale, and Hartley (1979), it was suggested that the following recommendations be considered in trail management options:

- a.) Intensive use areas, such as trails and campgrounds, should be permanently designated and, to the extent possible, use should be concentrated on them; vegetation is destroyed too easily and recovers too slowly to permit rotation of use.
- b.) The visitor who stays on trails sees essentially undisturbed vegetation if he looks beyond the trail's edge. Occasional forays into level dry grasslands do relatively little damage; damage increases with increasing slope, tall shrub or forb vegetation, and soil water content.
- c.) The impacts of both horses and motorcycles are significantly greater than those of hikers with respect to physical damage (destruction of vegetation, erosion, and compaction), trail-side grazing, manure, air pollution, and noise. If an area is to receive multiple use, it seems especially important to keep horse and cycle traffic moving on trails with gentle slopes (less than 15 percent) and at low speeds (less than 20 km/hr =

12 MPH). If one area is to be used by hikers, motorcycles, and horses, transportation carrying capacity should be allocated according to the reciprocal of damage done by each mode of transport.

- d.) Since hikers and horses tend to be most destructive when moving downslope, traffic should be directed, where feasible, so steep slopes are ascended and gentle slopes are descended. For motorcycles the opposite is true.

In a study of trampling impact upon the natural vegetation, Weaver, Dale, and Hartley (1979) found that trampling impact generally increases with increased user number whether hiker, motorcycle or horse (Table 1).

Table 1. The effect of hiker use on level meadow vegetation (Festuca-Poa):

Number of passes	0	300	600	900
Bareground (%)	2 _± 2	8 _± 3	18 _± 4	45 _± 8
Width (cm)	0 _± 0	12 _± 5	24 _± 4	26 _± 3
Depth (mm)	16 _± 2	37 _± 11	39 _± 3	40 _± 4
Bulk density (gm/cc)	1.01 _± 0.01	1.09 _± 0.07	1.11 _± 0.03	1.18 _± 0.02

User impact generally increases from hiker to cycle to horse (Table 2).

- 1.) On a level site, for example, 50% bare ground is reached after 1000 hiker, 1000 cycle, and 600 horse passes on a grassy site and after 300 hiker, 50 cycle, and 50 horse passes on a forested site.
- 2.) Trail width probably increases from hiker to cycle to horse because trampler width increases in this order.
- 3.) Trail depths increase from hiker to cycle to horse because of tendencies of each trampler to compact and/or move soil.
- 4.) Soil bulk density clearly increases from hikers with relatively light weights and large bearing surfaces to horses with relatively heavy weights and smaller bearing surfaces.

Table 2. The effects of 1000 user passes on level forest or grassland:

Trampler		Hiker	Cycle	Horse
Bare ground (%)	grassland	47 \pm 8	50 \pm 10	72 \pm 7
	forest	98 \pm 1	98 \pm 2	100 \pm 0
Width (cm)	grassland	28 \pm 1	34 \pm 6	84 \pm 4
	forest	34 \pm 1	62 \pm 2	68 \pm 3
Depth (mm)	grassland	42 \pm 4	49 \pm 4	68 \pm 7
	forest	23 \pm 3	36 \pm 7	64 \pm 10
Bulk density (gm/cc)	grassland	1.2 \pm 0.0	1.3 \pm 0.0	1.3 \pm 0.0
	forest	1.1	1.0	1.2

The impact of trampling increases with increasing slope (Table 3) whether the trampler is a hiker, a cycle, or a horse. Rates of vegetation destruction probably increase on slopes because shearing increases: force applied and slippage increase while area of application may decrease. Trail width probably increases because the trampler is under poorer control moving downslope than on level or upslope trails. Increases in trail depth with slope may be due to

greater compaction and/or movement of the soil followed by greater water erosion of the bared surface. Bulk density increases indicate application of greater forces to the surfaces of sloping trails.

Table 3. The effect of slope on trailwear after 1000 passes in a grassland:

	Hiker		Cycle		Horse	
	Level	Slope	Level	Slope	Level	Slope
Bare ground %	47	66	50	100	72	100
Width (cm)	28	44	34	68	84	83
Depth (mm)	4.2	6.2	4.9	7.0	6.8	8.6
Bulk density (gm/cc)	1.15	1.28	1.26	1.43	1.31	1.51

Motorcycles tend to be more destructive when moving up rather than down a 25 percent slope while horses and hikers tend to be most destructive when moving downslope (Table 4). The probability of spinning a wheel when moving upslope is apparently greater than sliding (via braking) when moving downslope despite the fact that the force applied in accelerating upslope should equal that applied in resisting acceleration by gravity downslope.

Table 4. The effects of a 25 percent slope on uphill vs. downhill traffic in a grassland. (The larger of each pair of values is underlined when the values differ significantly).

	Hiker		Horse		Cycle	
	up	down	up	down	up	down
Bareground % 500 passes	7	<u>66</u>	63	<u>89</u>	100	100
Width (cm) 100 passes	38	<u>49</u>	83	73	<u>70</u>	66
Depth (cm) 1000 passes	4.4	<u>7.9</u>	6.8	<u>10.9</u>	<u>7.6</u>	6.4

In a related study (Cole, 1979), it was concluded, for the Eagle Cap Wilderness at least, that the vegetation of meadows and open forests changes less following the construction and use of trails than the vegetation of dense forests. Ecologically this makes sense because open vegetation types have understories dominated by species with growth forms and organ structures that facilitate trampling survival. Moreover, these types are less altered by trail construction and they have evolved in conjunction with trampling stress from native animals.

These results imply that vegetation alteration could be minimized by locating trails and camps in meadows and open forests where understories are dominated by graminoids and heliophytic plants. Densely forested areas should be avoided, particularly where understories are dominated by woody shrubs and erect forbs.

This is a surprising conclusion considering the common practice of encouraging camping in and routing trails through forests rather than meadows. Although the justification for this practice is usually that it reduces ecological damage, this conclusion may be based more on evident visual deterioration than on actual ecological deterioration. Human impact on meadows is much more obvious to visitors than impact on forests, even if meadow impact is less severe. This emphasis on visual criteria would be justified if it were consciously recognized that management actions were minimizing visual impacts at the expense of maximizing impacts on the vegetation. The concern is that this trade-off situation has not been recognized and that this visual emphasis has occurred by default because of the lack of comparative data for different ecosystems.

Although locating trails and campsites in meadows may minimize vegetation alteration, such an action may maximize soil erosion, wildlife disturbance, visual changes and the likelihood of seeing other parties. For example, many subalpine meadows have fine-textured soils and perennially high water tables so trails often become knee-deep in mud when subjected to heavy use.

Additional trails on ridges, meadows, and valley bottoms mean less habitat is available to retiring wildlife species (Ream, 1980). In areas where motorized vehicles are permitted, they would be expected to have substantial auditory impact. A motorcycle becomes just audible in a forest environment at distances ranging from 1,400 feet to 3,900 feet from the receiver, depending on the size and type of cycle (Harrison, 1974).

The following suggestions are offered by Cole (1979) for backcountry managers who need to make decisions regarding locations of trails and campsites: Determine for each major ecosystem type the changes in environmental characteristics associated with the construction and use of trails or campsites. Both the biophysical nature of the backcountry area and the inclinations of the area's manager will determine the parameters to be considered. Vegetative cover, species composition, wildlife populations, soil compaction, soil texture, soil depth, and organic-matter content consistently change along trail corridors and in campsites.

Management can also be assisted in their analysis of an area through trailside registration. Information collected often includes group size, travel route or destination, length of stay, method of travel, activities participated in, and the group leader's name and address (Leatherberry and Lime, 1981; and Echelberger, Leonard, and Plumley, 1981). Trailside registration is relatively inexpensive to install and maintain and their operation requires no staffing increase. The problem

with such a system is that not all people register. Voluntary trail registration compliance on backcountry trails has ranged from a high of 89 percent recorded in Colorado's Rawah Wilderness (James and Schreuder, 1972) to a low of 28 percent of the groups entering the Selway-Bitterroot Wilderness in Montana (Lucas, 1975). A major factor affecting compliance rates may be the location of the trailside registration box. It must be easily visible to the hiker and located in a good section of the trail. The box should be located in a favorable microclimate with minimal distractions nearby. Ideally, the register must be located at least 400 feet from the trailhead and parking area. Such a location is removed from the confusion often associated with these places and from the non-trail users who could wander into the parking area and vandalize the equipment. It is also recommended that trail registers be regularly and carefully serviced. Not only does the visitor need all the materials to properly register, but a well maintained facility suggests to the visitor that registration requirement is viewed by the agency as an important, high priority activity (Leatherberry and Lime, 1981).

IV. INTRODUCTION TO DISPERSED RECREATION SITE DEVELOPMENT:

One of the major problems confronting management of backcountry recreation areas is visitor dispersal. Management must improve distribution of visitors by diverting use from popular to less popular places. The real challenge is to minimize both the number of campsites and the degree of impact upon each.

The conflicting goals of accommodating more visitors and ensuring quality recreational experiences demand knowledge, not only of the visitors expectations, but of their physical and psychological impacts upon each other. These impacts are most critical near campsites where visitors spend much of their time and where desire for solitude may be the greatest (Hendee, 1967; Stankey, 1973). Abundant spacing between campsites is most critical in the "interior" as opposed to "peripheral" portions of a roadless area. Stankey's research indicates that encounters near the trailhead are more expected and therefore more tolerated than encounters in the interior. Concentrations of users on trails and near the periphery drop sharply as the distance covered increases. This evidence suggests that the farther removed a camping area is from the trailhead, the more important it is in terms of visitor satisfaction that the campsites be spaced to allow most "people" noises to be screened out. Limiting the size of parties is an important tool in alleviating damage to the resource. Large groups are excessively destructive of resources not only because of the large amount of space they require, but also because of the intensive nature of the use.

The noise and congestion often associated with large groups is another reason to limit party size (Lime and Stankey, 1971).

The impact of crowding and its relationship on visitor enjoyment was studied by Shafer and Burke (1965) who found about one out of three persons desired a spacing of 250-400 feet. A study of National Forest campers in Minnesota (Lime, 1971b) found that nearly all parties preferred to be well separated and screened from their neighbors. In contrast, Burch and Wenger (1967) found many recreationists prefer and even seek areas that afford opportunities to be close to others. A study of three western wildernesses (Stankey, 1971) found that tolerance to crowding was a function not only of the level and type of use encountered, but also of where and when the encounter took place and the destructive behavior of the visitor. Reporting the results of a survey of almost 500 visitors to four Wilderness Areas, Stankey (1973) concluded that "most visitors consider low intensities of use, involving only few encounters, as an important dimension of the wilderness experience."

It has been suggested (Daily and Redman, 1975) that campsites not be located in meadows or near lakeshores. The acoustic properties of the still air above a lake surface do little to decrease the intensity of noise traveling across a lake. Campsites should not be located directly across a lake from one another but along uneven shorelines set back

from the lake in dense vegetation. Maximum advantage of environmental features such as rises, ridges, rocks, and hills should be incorporated in the location of campsites to reduce both noise transmission and visual perception of the human origin of noise. Locating camps in areas with high background noise will allow closer campsite spacing while maintaining auditory isolation. It has been further suggested (Hendee, Stankey, and Lucas, 1978) that durable sites secluded from trails and other campsites and set back from shorelines but still with a view and a feeling of reasonable proximity to the water would seem to be the ideal for which to strive.

In a related study (Cole, 1982), it was indicated lakeshore setbacks are becoming increasingly common in wilderness. A common justification for this practice is that lakeshores are more fragile than sites set back from the lake. Cole found that in comparison to setback sites, lakeshore sites tend to be somewhat larger, but less of the site is devoid of vegetation. They have fewer seedlings but more vegetation cover, with species composition less highly altered than on setback sites. Bare ground is less extensive, but the organic horizons are thinner. Given that seedling loss is the only impact which is more extreme on lakeshore sites, the contention that lakeshores are more fragile appears to be unfounded. This is not to say, however, that there are no justifiable reasons for prohibiting camping close to lakeshores.

Although water quality studies show little evidence of human health hazards associated with heavy use of backcountry lakes (McDowell, 1979), there is some evidence that ionic concentrations and benthic plant populations can be altered by heavy use (Taylor and Erman, 1979). Where lakes are uncommon and attract abnormally large numbers of visitors, there may be some danger that all of the lakes will be altered by human use. In this case, the justification for setbacks is not that lakeshores are more fragile, but that the lake ecosystem is rare and should receive special protection. Another justification for setbacks is that more trails tend to develop between campsites and the lakeshore when the site is located close to the lake. This causes more aesthetic and ecological impact--not because the lakeshore site is more fragile, but because the flow of traffic between campsite and lakeshore is more destructive.

There are also a number of sociological justifications. Parties camping on the lakeshore effectively claim that territory as their own, prohibiting other parties from having free access to the lakeshore (Hendee, 1977). The perception of solitude is increased by moving people back from lakeshores because their visibility is decreased and noise does not carry as readily. Prohibitions on camping close to lakes will keep visitors from camping where they most like to camp.

Research indicates (Cole, 1981) that most changes in campsites occur with even light use and that an increase in use causes little additional change. Comparable studies show that differences in soil organic matter, bulk density, compaction, and moisture content are much greater between unused and lightly used sites than between lightly and heavily used sites (Dotzenko, 1967). Consequently, reduced camping on heavily used sites will do little to decrease site alteration. It is important to note, however, that in a study of campsites located near subalpine lakes in the Eagle Cap Wilderness of Oregon (Cole, 1982), seven impact measurements (out of twenty-seven) increased significantly in magnitude when campsite use increased. Reductions occurred in seedling density, vegetation cover, duff depth, increases in bare ground, bare area, trees with exposed roots, and floristic dissimilarity of the undergrowth all became more pronounced. As use increases from light to moderate amounts, organic litter continues to be removed, creating more bare ground and reducing duff depth; more trees are exposed; the central area devoid of vegetation increases in size; and the composition of the undergrowth continues to change.

There has been a general assumption that the primary cause of site alteration is the difference in use intensity - that campsites in poor condition receive heavy use, while sites in good condition receive only light use. Campsites in good condition, however, often receive more use than those in poor condition (LaPage, 1967; Schreiner and Moorehead, 1979). This is not to say that if everything else is equal, increased use will not increase impact. It does suggest, however, that amount of

use is less important than other factors. Site location, for example, may be much more important than amount of use. For example, Cole (1979) found that meadow vegetation is usually less severely disturbed by camping than the understory plants in adjacent forest.

Another important factor is the type of use. Campsites frequented by horse parties are often in worse condition than backpacker sites. In the Spanish Peaks Primitive Area in Montana, horse camps were found to be ten times larger than hiker camps and they had seven times as much bare ground (Frisseil, 1973).

Most site impacts do not appear to sharply reduce site desirability. Most evidence suggests that visitors seldom notice or are bothered by impacts on campsites. In a study in Yosemite National Park, for example, it was found that the use of wood for fires, destruction of ground cover, damage to trees, and other ecological changes in a pristine environment had less influence on the visitor than the presence of "unnatural" objects such as litter, horse manure, or constructed facilities (Cole, 1982). The impact most likely to decrease the future desirability of campsites is the loss of seedlings and saplings which may forecast the eventual deforestation of campsites. Most campers prefer campsites that are shaded to those in the open (Cordell and James, 1972).

Where recreation use is heavy, managers may wish to convert the natural vegetative cover to more hardy species (LaPage, 1967). A number of conifers and hardwoods have been identified (Ripley, 1962) which demonstrate considerable resiliency in the face of heavy recreation use. Thinning the overstory also can increase the resistance of trees and understory vegetation to abuse (Wagar, 1965). Judicious thinning could be done to protect soil moisture values while not appreciably reducing the amount of shading for visitors. Another study has shown that visitors generally chose revegetated campsites (Hancock, 1973). This suggests that maintenance of the overstory is probably more important than maintenance of the understory. It is also more feasible. Maintenance of native understory populations, except on protected sites, is realistically impossible because trampling cannot be eliminated.

Sites that have been damaged by overuse will eventually recover given enough time. The demand for recreational space is such, however, that most managers cannot afford to have a substantial proportion of the areas under their administration tied up in natural restoration. As a consequence, managers will generally need to assist natural recovery processes. Irrigation, fertilization, and reseedling can greatly accelerate the recovery of sites. Herrington and Beardsley (1970) found that an application of water, fertilizer, and seed would revegetate 70 percent of the cover at campgrounds in central Idaho in only three years, a percentage unattainable through the application of seed alone. Regeneration can also be assisted through the positioning of physical barriers such as posts, logs, rocks, trees, and brush.

The impact most likely to reduce the functional ability of a campsite is long-term erosion (Cole, 1982). Tree root exposure provides some indication of the amount of erosion which has occurred on a site. Severe erosion is rare because campsites are usually flat and compaction reduces the detachability of soil particles, inhibiting erosion by surface runoff.

Management objectives must consider the physical resources of the area and the attitudes of users. Both of these variables are affected by increasing loads of recreationists and may together or by themselves establish constraints on the amount of use an area may sustain (Lime and Stankey, 1971).

CHAPTER THREE

PROCEDURES

I. APPROACH

The literature review and related procedural applications will provide management with current research and guidelines which will assist in the management of recreation resources within the study area. Management can then correlate these data with their own expertise and knowledge of the area. The result would be acceptable recreation management practices which are consistent with suitable carrying capacities while retaining the environmental integrity of the area.

The issue of carrying capacity is a sensitive issue and the final decision regarding its application rests with the unit manager. It is particularly important that management decisions are not based upon erroneous assumptions and/or conclusions. The investigator has compiled a diversified list of data sources which can help management better understand the numerous uses and conflicts within dispersed areas and plan for it accordingly.

II. COLLECTION OF DATA:

There are four major components which comprise the Collection of Data procedures: field review by the investigator; review of Forest Service manuals and handbooks; literature search WESTFORNET; and interviews and discussions.

- a.) Field review by the investigator: During October 1982, portions of the 9,290 acres comprising the Shell Management Unit were again field checked by the investigator. Approximately 200 photos were taken of the area. This documentation will be used primarily for future comparative analysis of resource impacts and site regeneration capabilities. All field notes, photos, and related data are on file with the Recreation Officer, Hume Lake Ranger District. Information was also compiled on various recreation uses and related user conflicts. Particular emphasis was given to areas where concentrated recreation use is occurring, i.e., the entire trail system, Rowell Meadow, and Jennie and Weaver Lakes.

Field assessments were conducted for each of these component areas in an attempt to better understand the resource impacts which were occurring to various recreation facilities and the physical environment. The information obtained in the field assessment process culminated in the identification of several "emphasis issues" the project paper will address:

1. Planning analysis
2. Interpretive services
3. Trail management
4. Carrying capacity and its relationship to:
 - a.) User conflicts.
 - b.) Accelerated resource change.
 - c.) Impacted facilities.
 - d.) Quality of the recreation experience.
 - e.) Environmental quality.
 - f.) Recreation facilities development.

b.) Review of Forest Service Manuals and Handbooks, laws, files and related correspondence: The second step in the procedural application was to identify those documents currently available on the District which provide guidance and direction regarding the "emphasis issues." The following abbreviated bibliography of District source documents provided the base of information necessary to implement a literature search:

1. Forest Service Manual:
 - Chapter 1660: Interpretive Services
 - Chapter 2300: Recreation Management
 - Chapter 2313: Recreation - Dispersed Areas
 - Chapter 2350: Recreation - General Forest Environment Areas
 - Chapter 2380: Visual Resource Management

2. Forest Service Handbook 1909.12: Recreation Input to Land and Resource Management Planning.
3. Forest Service Handbook 2121.4 (Region Five): Ranger District Multiple Use Plan.
4. Forest Service Handbook 2309.11: Recreation Information Handbook.
5. Forest Service Handbook 2309.13: Recreation Planning
6. Forest Service Handbook 7709.12: Trails
7. Recreation Opportunity Spectrum Users Guide
8. Sequoia Off-Road Vehicle Management Plan
9. Sequoia Land Management Plan (in progress)
10. Title 36, Code of Federal Regulations
11. National Forest Outdoor Recreation Resources Review field notes - 1960
12. Multiple Use - Sustained Yield Act of 1960.
13. Forest and Rangeland Renewable Resources Planning Act of 1974, (RPA).
 - a.) Forest and Range Lands Situation in the U.S. (Assessment).
 - b.) Recommended Renewable Resources Program (Program).
14. National Forest Management Act of 1976 (NFMA).

c.) Literature Search - WESTFORNET: Based upon information provided by Ginger Rutherford of SOUTHFORNET at Clemson University, a literature search was commenced. Using "key search words" primarily from the "emphasis issues" resulted in a computerized printout of forty-five articles. Approximately twenty of the articles which appeared to provide input for this project paper were then requested from WESTFORNET. Upon receipt, each article was evaluated for its content and applicability to the project paper. Many of the articles contained extensive bibliographies and this resulted in a third request to WESTFORNET for an additional fifteen research articles. It is important to keep in mind that as data are developed from the literature search it may be necessary to go back and request additional documents from WESTFORNET. The foundation of this project paper is founded primarily on the Recreation Short Course at Clemson University and related research publications and documents provided by WESTFORNET.

d.) Interviews and Discussions With:

1. District and S.O. staff specialists.
2. Other land management agency personnel:
 - a.) National Park Service
 - b.) Bureau of Land Management
3. Visitors to the area.
4. Forest Service employees who worked within the area during the summer of 1982.

5. Volunteers: California State Horseman Association, California Conservation Corps, Campground Hosts.
6. Permittees: Lewis Goins, Goins Cattle Company; Dave Wilson, Horse Corral Pack Station; Tracy Terzian, Cedar Grove Pack Station.

Discussions with these individuals have provided additional dimension, clarity, and objectivity to issues not previously discussed. These groups were an excellent source of information because they have been actively involved with previous management of the area and/or are most likely to be impacted by future management decisions.

III. TREATMENT OF DATA:

Each of the four components utilized in the Collection of Data has provided input regarding field inventory, policies and procedures, pertinent research, current uses and concerns, and how similar areas are managed. The data gathered in these procedural applications will be used in the subsequent discussion on Analysis of Data. Chapter Four will include an introductory statement followed by three major sub-chapters which tie in with the stated objectives of the project paper, ie.:

- a.) Interpretive Services Plan.
- b.) Trail Management Plan.
- c.) Dispersed Recreation Site Development Plan.

Information gathered through the various procedural applications in this chapter will help in the analysis of user conflicts, accelerated resource damage, adversely impacted facilities, and quality of recreation experience provided. Secondary information concerning visitor trends, usage, and carrying capacity can also be developed from this information.

CHAPTER FOUR

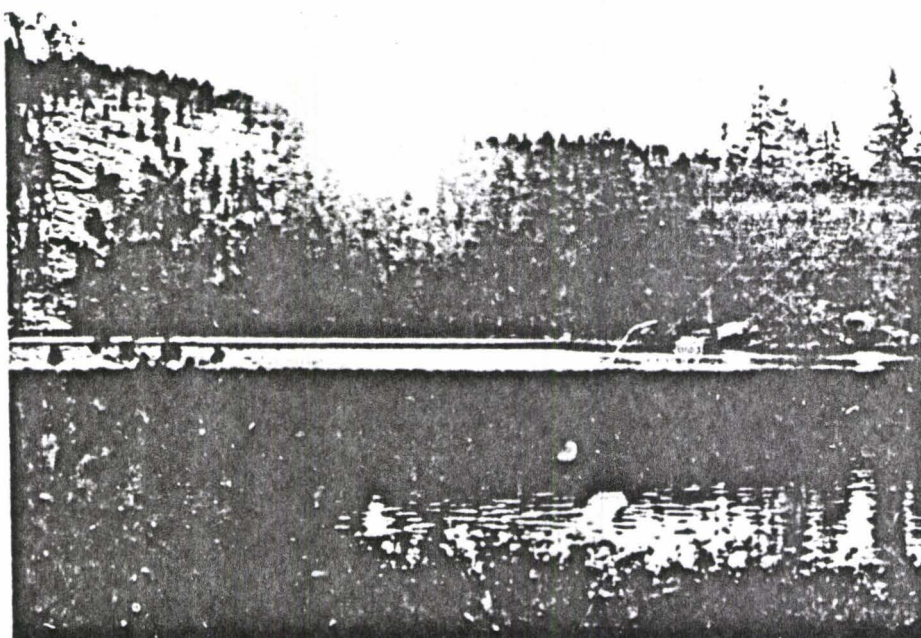
ANALYSIS OF DATA

I. INTRODUCTION:

The Shell Management Unit is approximately 9,290 acres of National Forest land located entirely within the southeast portion of the Hume Lake Ranger District. Elevations range from 7,600 feet at Boulder and Stony Creeks to 10,365 feet at Mitchell Peak. Precipitation, which occurs mostly as heavy snow in the winter and early spring, averages 45 inches per year. Average daytime mean temperature during the summer months is 75 degrees. The unit has an exceptionally high scenic beauty, characterized by rugged barren peaks, rocky slopes, and stringer meadows. Two beautiful subalpine lakes (Jennie and Weaver) are the principal attractions in the area. The lakes offer pleasant opportunities for primitive camping and dispersed recreation activities. During 1982, the California Department of Fish and Game stocked each lake with 4,000 brook trout fingerlings.



Shell Management Unit - looking north from Poop Out Pass



Jennie Lake



Shell Management Unit - looking southeast from Jennie Ellis Trail
(29E05)

The sub-alpine timber stands consist of virgin red fir, mountain hemlock, western white pine, and extensive lodgepole stands in the vicinity of Rowell Meadow. The scattered understory is predominantly manzanita and deerbrush. Forage tends to be located in the scattered

meadow areas which have been grazed by cattle for several decades.

Soils are shallow, porous, and largely granitic. The area is a major source of water for the Kings and Kaweah Rivers. Approximately thirty miles of trail are located within the Unit of which seventeen miles are designated ORV routes.

The only known rare plant habitat within the Shell Management Unit is the purple mountain parsley (*Creonana purpurascens*). The species is most often found on open ridgetops in the red fir forest generally between 8,300 and 8,500 feet. This species has been primarily located in rather deep gravelly soils of granitic origin adjacent of the Weaver Lake Trail (30E09) and Jennie Ellis Trail (29E05) in the vicinity of Shell Mountain.

The Shell Management Unit is part of the 13,700-acre Jennie Lakes RARE II Area. The Final Environmental Statement for the area dated January 4, 1979 recommended an allocation of nonwilderness. This decision was appealed by the State of California. The Jennie Lakes RARE II Area is now one of 44 "State Suit" areas. The U.S. District Court ruled on January 8, 1980 the RARE II EIS was inadequate. The decision was appealed to the U.S. Court of Appeals for the Ninth Circuit which generally upheld the District Court decision. Until follow-up actions are determined, the Regional Forester has directed that "State Suit"

areas will continue to be examined in Forest Plans. In addition, the Shell Management Unit is included in a bill (S. 5 as reported 1/26/83) sponsored by Senator Alan Cranston proposing transfer of the entire area to the National Park Service.

The Shell Management Unit is bordered on the northeast by the proposed Mitchell-Maddox ski area complex which has a potential carrying capacity exceeding 10,000 skiers at one time. The entire east and south sides of the unit lie adjacent to the Kings Canyon National Park which makes overall planning, management, and coordination critical. Major access trails to the backcountry areas of the Park pass directly through the unit. The management objective for the area has been to conserve the natural environment.

The Visual Quality Objective for the unit is retention. The VQO describes different degrees of acceptable alteration of the natural landscape based upon the importance of aesthetics. The degree of alteration is measured in terms of visual contrast with the surrounding natural landscape. The unit is divided primarily between FGIA/R for trails and MGIA/R for the remainder of the unit. These symbols are further illustrated as:

FG: Foreground

MG: Middleground

- 1: Sensitivity levels indicate a particular degree or measure of viewer interest in the scenic qualities of the landscape. A level 1 sensitivity would indicate at least one-fourth of the Forest visitors have a major concern for the scenic qualities.
- A: Variety Class A refers to those distinctive areas where features of landform, vegetative patterns, water forms, and rock formations are of unusual or outstanding visual quality.
- R: The Visual Quality Objective of Retention provides for management activities which are not visually evident.

The Visual Absorption Capability (VAC) is an estimate of the relative ability of a landscape to accept management manipulations without significantly affecting its visual character (FSM 2383.21). The unit is about evenly divided in this ability between low, intermediate, and high classifications.

The Recreation Opportunity Spectrum (ROS) provides a framework for defining the types of outdoor recreation opportunities the public might desire and identifies that portion of the spectrum a given area might be able to provide (ROS Users Guide 1981). The entire Shell Management Unit is classified as Roaded Natural (RN) except for a small buffer

strip classified as Semi-Primitive Non-Motorized (SPNM) which is located adjacent to the easterly and southwestly boundaries of the area. The ROS classification was based primarily on physical, social and managerial settings.

Two cultural sites reportedly exist within the Unit. An obsidian flake scatter site (CA-TUL-101) has been recorded on the southwest side of Shell Mountain. The site is located in an isolated area and is not impacted by present or proposed management. A second "site" has been reported northeast of Weaver Lake, the exact location of which is unknown. This site has never been recorded nor is any action proposed for this area.

Dispersed visitor use has generally increased each year since 1974. The following table is a representative sampling of dispersed types of recreation activities occurring within the Shell Management Unit during the past nine years. Visitor days shown in thousands.

	<u>ORV's</u>	<u>Foot</u>	<u>Horse</u>	<u>Nordic</u> <u>Skiing</u>	<u>Snow</u> <u>Mobiles</u>	<u>Camping</u>	
						<u>Weaver</u> <u>Lake</u>	<u>Jennie</u> <u>Lake</u>
'74	.2	1.7	.3	-	-	1.2	1.1
'75	.2	2.8	.5	-	-	6.0	4.8
'76	.2	8.9	.5	-	-	3.8	3.8
'77	.3	8.0	.2	-	-	1.8	1.0
'78	.2	8.9	.5	-	-	3.4	3.0
'79	.2	8.9	.5	-	-	2.8	1.9
'80	.4	12.5	.9	-	-	3.0	2.2
'81	.4	13.4	1.0	3.5	.1	2.3	2.6
'82	.4	15.8	1.1	5.4	.2	1.9	2.0

ASSUMPTIONS:

Projected recreation use is expected to increase at a moderate rate of five to eight percent during the next five years. Equestrian use is expected to increase ten to fifteen percent annually. A horse camp was recently constructed at Big Meadows which will encourage this use.

Backcountry nordic skiing is expected to increase by twenty-five percent

annually due to the increasing recognition the Big Meadows cross-country ski area is receiving. Dispersed camping is expected to increase at a moderate level; however, use can fluctuate considerably as snow conditions determine the length of season.

The entire Shell Management Unit is politically sensitive in nearly every regard. This has been recognized in RARE II, the California "State Suit" litigation, and proposed legislation brought before the Congress to annex the entire area into the Kings Canyon National Park. Current direction is to manage for further planning until completion of the Forest Land Management Plan. In lieu of proposing unmanageable objectives, it was felt Wagar's (1964) discussion of managing for carrying capacity should be the basic underlying foundation for future management of the Shell Management Unit, i.e.:

- a.) Reduce conflicts among competitive uses.
- b.) Reduce the destructiveness of people.
- c.) Increase the durability of the physical resource.
- d.) Provide increased opportunities for visitor enjoyment.

The following analysis on Interpretive Services, Trail Management and Dispersed Recreation Site Development are integrated with these objectives.

II. INTERPRETIVE SERVICES PLAN:

The Interpretive Services Plan proposes five major objectives which are designed to provide timely and accurate information regarding the availability and diversity of recreation opportunities. Ideally, a large number of activities, together with a single map could be presented in one brochure which would illustrate:

- a.) What dispersed activities are available.
- b.) Where can they be enjoyed.
- c.) How to get there.
- d.) What you need to enjoy them.
- e.) Basic regulations.

The Interpretive Service Plan should be integrated with the management objectives previously discussed in Chapter One. These objectives can be achieved by three overlapping courses of action:

- a.) Site Management: Imaginative site design, landscaping, and engineering can effectively increase the carrying capacity of some sites by channeling the movements of visitors, thereby limiting the impacted area, providing surfaces that withstand intensive use, and providing access to areas that are otherwise unused or very lightly used (Lime and Stankey, 1971).

b.) Modification of visitor behavior through direct regulation:

Direct regulation includes rationing use either for an area as a whole, for each access point, or by campsites. These are powerful tools that could shift use patterns substantially. However, they also are heavy-handed, authoritarian measures, usually with high administrative costs. The impact of such bureaucratic control on a recreational experience, especially a backcountry experience, is likely to be substantial and negative. In some cases, conditions require this trade-off, but indirect management is generally worth trying first before resorting to direct regulation (Lucas, 1981).

c.) Modification of visitor behavior by means of indirect and more subtle measures: Indirect management is usually not obvious to visitors. Visitor behavior can be modified by management actions such as changing access to make it easier or more difficult by changing the last part of an access road into a trail. Providing information to visitors to influence their choices of routes is another indirect visitor management technique.

The use of information to redistribute use is a particularly appealing approach (Fazio, 1979). It is non-authoritarian and permits the manager to be a helpful guide rather than someone who restricts and regulates. As a result, conflict and controversy can be avoided. Surveys show that backcountry visitors have high educational levels, indicating an ability to understand and use fairly complex information (Lucas, 1981).

RECOMMENDATIONS:

Implement an Interpretive Service Plan (ISP) which compliments the objectives in Chapter One. The Plan should be the primary vehicle for dispensing information to the visitor regarding:

- a.) Where it is
- b.) What it is
- c.) How to get there

The primary emphasis of the Interpretive Service Plan should be based on:

- a.) Recreation Opportunities: Examples would include backpacking, hiking, camping, fishing, hunting, scenery, ORV use, etc.
- b.) Features and Facilities Within the Area: A short discussion on Rowell Meadow, Jennie and Weaver Lakes - what to expect in the way of people and related facilities and how, when and where to avoid these areas of concentrated recreation use. Development of an alternate "idea list" of other activities, scenic areas, places to camp, areas of solitude, etc. A short discussion on the wildlife, geology, flora and fauna may also be helpful to the visitor.
- c.) Backcountry Skills: What to expect and how to prepare for the challenges in the backcountry. Basic skills in survival (food, clothing, shelter), woodsmanship, weather observations, mountaineering, and map and compass reading. How to "read" the lay of the land and what to do if lost. Basic concepts of environment, conservation, and other outdoor values.

- d.) Camping Skills: How, when, and where to pitch camp. Recognizing a safe site. Adverse social and physical impacts caused by improper site selection and/or careless campers. Stress "No Trace Camping" and "Pack In - Pack Out" concepts along with tips on good housekeeping procedures.
- e.) Trails Management: Where the trails are located and identified. Where do they go? What is the distance and time involved in hiking to various locations? What is the relative difficulty and maintenance of the trail and its proximity to water? Which trails are most heavily used and open (or closed) to ORV use?
- f.) Regulations: State and Federal regulations concerning fishing and game laws, occupancy and use of N.F. lands, campfire regulations, ORV use, etc.

All of this information could be easily compiled together with a simple map into one inexpensive brochure which would be retained by the visitor. These brochures would then be placed in self-service dispensing units along with other brochures on such items as "No Trace Camping" and "Pack In - Pack Out," etc. These units would be located at the major trailhead facilities located at Stony Creek, Big Meadows and Sunset Meadow. Additional information facilities would be located at Rowell Meadow, Jennie and Weaver Lakes. By providing this visitor information, recreationists could take better advantage of the Unit's recreation potential by deepening their sense of appreciation and awareness for the natural environment.

Supplemental information concerning the Kings Canyon National Park should also be provided. Information regarding backcountry trails, camping facilities, points of interest, etc., would be helpful information to the Park visitor. This information would also benefit the National Park Service in their management of backcountry use. The Rowell Meadow cabin would be the best centralized location to emphasize this visitor information.

III. TRAIL MANAGEMENT PLAN:

Located within the Shell Management Unit are nine trails totalling approximately thirty miles in length. Three major trailheads located at Stony Creek, Big Meadows, and Sunset Meadow provide access to the area. Off-road vehicle use is allowed within the unit on the following designated ORV routes: Jennie Ellis (29E05); Weaver Lake (30E09); J.O. Pass (30E11) and Marvin Pass (30E06). A moderate to heavy amount of packstock use is occurring on the Rowell Meadow (30E08); Marvin Pass (30E06); and Kanawyer Gap (30E07) trails. The Sheep Creek (30E06.2); Marvin Pass (30E42 and 30E06); and Rowell Meadow (30E08) trails have been heavily impacted by trampling caused by packstock. The primary stock users on these trails are the National Park Service who service their backcountry stations in the Kings Canyon National Park and the Horse Corral pack station under Forest Service Outfitter-Guide Permit. Additional minor adverse impacts on trails may be caused by cattle belonging to the Goins Cattle Company. Trails which receive the heaviest hiking pressure (listed in order of priority) are: Jennie Ellis (29E05) and Weaver Lake (30E09) trails, which provide easy access to Weaver Lake; Rowell Meadow (30E08) midway between Sunset Meadow and Rowell Meadow; Jennie Ellis (29E05) midway between Fox Meadow and Jennie Lake; and Marvin Pass (30E06) between the N.P.S. pack station and Rowell Meadow.

All of these uses combine to make management of this trail system a complex and controversial issue. Resource damage and the probability of user conflicts are beginning to surface with increasing dimension each

year. Some of these conflicts can be resolved by proper trail design standards which specify tread width, grade or slope, alignment, tread surface material, drainage, and width of trailside vegetation cleared. The extent of clearance of downed trees or other obstructions, signs, and types and locations of bridges are also important factors (Hendee, Stankey, and Lucas, 1978). The Forest Service Manual (FSM 2323.11c and 7730.31) now calls for a maximum trail width of 24 inches and trail locations that follow the natural contours of the land as much as possible and result in minimum disturbance of soil and vegetation. Trails should appear to be part of the country rather than an intrusion upon it.

The Trail Management Plan should be integrated with the management objectives previously discussed in Chapter One. These objectives can be further enhanced and complimented by the following specific trail management assessments and related recommendations:

a.) Stony Creek Trail: (29E06)

Stony Creek Picnic Area to Poop Out Pass. 3.7 miles.

This trail requires a constructed trailhead facility at the upper end of the Stony Creek Picnic Area. The trail is in need of realignment in the vicinity of T.14S., R.29E., Sections 26 and 34. The trail is excessively steep with sharp pitches and is perpendicular to the contour in several areas which creates serious erosion, loss of trail tread, and

subsequent fill-in or washout of waterbars. Approximately one-half mile of this 3.7 mile trail is in need of heavy maintenance and/or relocation.

b.) Jennie Ellis Trail: (29E05)

Big Meadows Road (14S01) to J.O. Pass. 7.9 miles.

This trail also requires a constructed trailhead facility at the terminus point on Big Meadows road (14S01). A suitable crossing structure (rock bridge) needs to be developed across Big Meadows Creek. Additional water bars need to be installed midway between Big Meadows Creek and Fox Meadow to check erosion of the tread surface caused by heavy rains in October 1982. The existing trail needs to be rerouted around a boulder field approximately 1,000 feet east of Poop Out Pass in T.14S., R.29E., Section 24. This will be an extensive undertaking and will require relocation of approximately 800 feet of trail. A management option would be to leave this trail segment "as is" to reduce ORV access to Jennie Lake in addition to not providing a thru ORV route within the southerly portion of the Unit. This trail serves as a partial link in providing access to Weaver Lake and therefore receives a considerable amount of diversified recreation use.

c.) J.O. Pass Trail: (30E11)

J.O. Pass to Rowell Meadow. 3.7 miles.

A moderate amount of maintenance is required on various sections of trail approximating one mile in length (T.14S., R.30E., Section 17, 20 and 29). The trail is a designated ORV route. A large amount of debris and rocks are annually removed from the trail to make it reasonably safe for this user group. The trail needs a minor amount of realignment. The trail crosses many small tributaries of Boulder Creek where improved stream crossings are necessary. The trail has been considerably improved in the area of Rowell Meadow where rock culvert structures have been installed to prevent deterioration of stream and riparian areas.

d.) Weaver Lake Trail: (30E09)

Fox Meadow to termini with J.O. Pass Trail (30E11) near Rowell Meadow. 5.9 miles.

This trail provides direct access to Weaver Lake and receives a heavy amount of foot, horse, and ORV traffic. The trail is in need of heavy maintenance between Weaver Lake and the J.O. Pass Trail (30E11). Particular emphasis needs to be given to that portion of the trail located within the Boulder Creek drainage. The trail tread has receded or eroded in many places; waterbars are not functional and many hazard trees are located adjacent to the trail. Several of the tributaries to

Boulder Creek are difficult to traverse. This maintenance has been deferred for several years due to higher priorities, lack of personnel, and budget constraints. Several management options are feasible for this trail:

- 1.) Designate the Weaver Lake Trail (30E09) as the only through ORV access route within the Shell Management Unit. See Recommendation d.5. later in this analysis.
- 2.) Agressively promote Volunteer "Adopt-A-Trail" program for regularly scheduled trail maintenance.
- 3.) Perform trail maintenance by Forest Service and California Conservation Corps Crews.
- 4.) Leave as is.
- 5.) Delete from the trail system that portion of trail midway between Weaver Lake and the Poop Out Pass Trail (30E11).

e.) Rowell Meadow Trail: (30E08)

Sunset Meadow trailhead (located at end of road 13S14) to the Sugarloaf entrance of Kings Canyon National Park. 3.8 miles. The trail requires a constructed trailhead facility at Sunset Meadow. There is a substantial need for improved parking facilities at the trailhead. The present arrangement encourages visitors to park wherever they can which causes adverse impacts upon the resources - particularly vegetation. There is a definite need for both Recreation and Engineering

to study the current impacts of vehicular, equestrian, and hiker uses at this heavily utilized trailhead. The problem is further compounded by an Outfitter-Guide Permittee who takes up critical parking space by parking his stock trailers for extended periods of time at the trailhead. Some of these problems can be mitigated to some extent by the permittee and by improved signing before people reach the trailhead parking area. The trail is in reasonably good condition between Sunset and Rowell Meadows. Recent gabion construction has stabilized the trail in several areas. The trail is being subjected to a significant amount of rutting and trampling between Rowell Meadow and the Sugarloaf entrance to the Kings Canyon National Park. It is quite likely this damage is being caused primarily by a F.S. permittee and the National Park Service who service their backcountry Ranger Stations weekly. It may be appropriate to ask both of these parties to mitigate the impacts of their activities by performing maintenance on those trails they utilize. The possibility of implementing a Cooperative Agreement and/or Volunteer Agreement needs to be considered with both users.

f.) Belle Canyon Trail: (30E43)

Rowell Meadow to Belle Canyon entrance to Kings Canyon National Park. 1.6 miles.

This trail is in very good condition due to proper location and reduced traffic. Some minor maintenance work needs to be done in riparian areas.



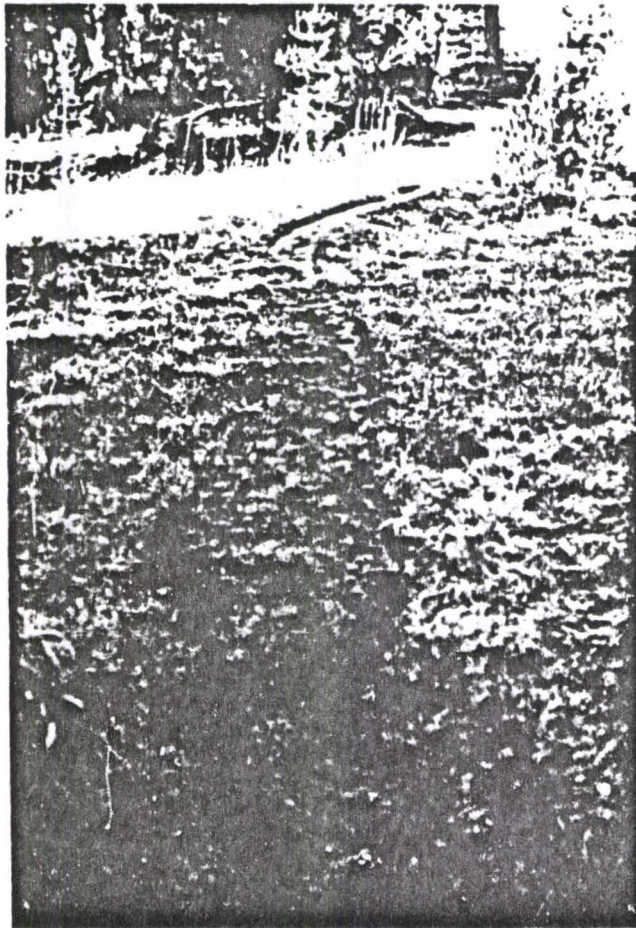
Belle Canyon Trail (30E43)

g.) Marvin Pass Trail: (30E06)

Rowell Meadow to Marvin Pass. 1.1 miles.

The trail is in reasonably good condition after extensive heavy maintenance performed last summer. The extensive trampling and rutting previously caused by packstock has been

corrected and rock culverts have been installed in stream crossings and riparian areas. Approximately 1000 feet of trail needs to be relocated away from the stringer meadows where resource damage can easily occur. Excessive trail signing exists at Marvin Pass. The trail needs to be closely monitored for resource damage due to packstock, hiker, and ORV uses.



Marvin Pass Trail (30E06)

h.) Kanawyer Gap Trail: (30E07)

Marvin Pass to entrance of Kings Canyon National Park. 1.2 miles.

The trail is in fair condition with the primary impact being caused by packstock. Problems associated with erosion and hazard trees are considered minimal.

i.) Mitchell Peak Trail: (30E07A)

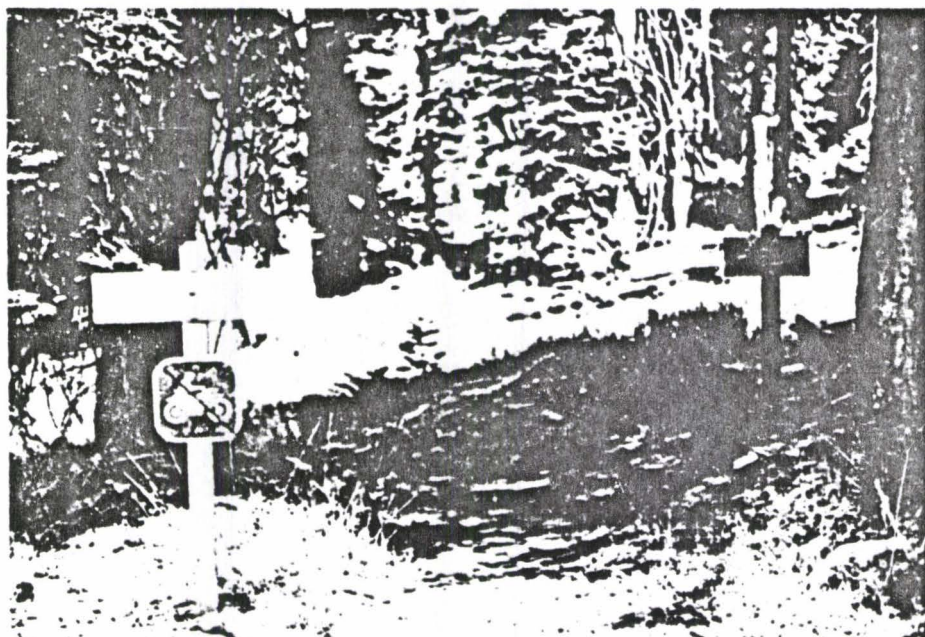
Termini with Kanawyer Gap Trail to Mitchell Peak. .9 miles.

This trail is lightly used. Both termini points need to be better defined. No major erosion or hazard tree problems. Trail relocation work will be required in one area where the trail has a steep 35 percent pitch.

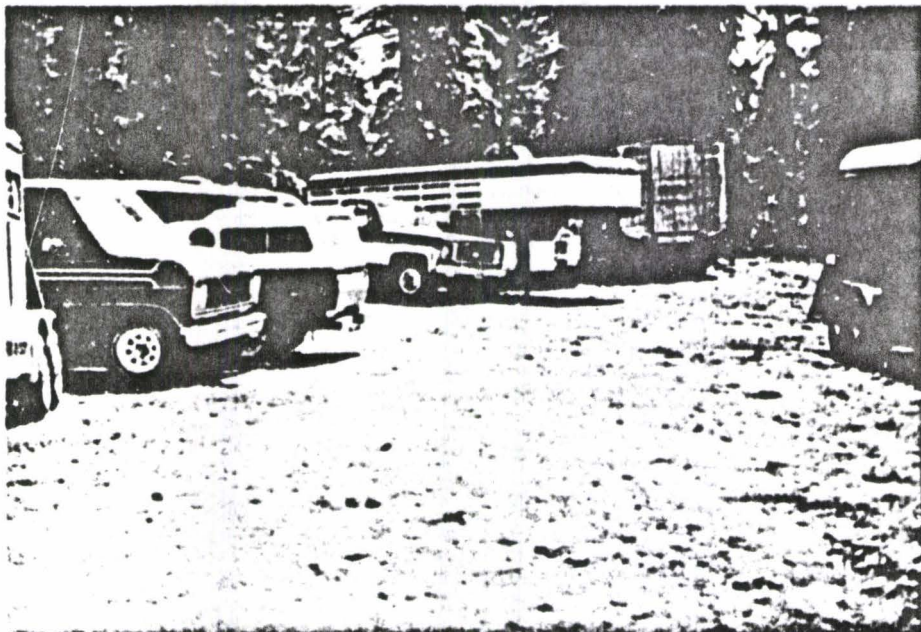
RECOMMENDATIONS:

Several recommendations can be made as a result of the findings. Each is designed to compliment and enhance the management objectives for the Unit, i.e.:

- a.) The Stony Creek, Big Meadows, and Sunset Meadow trailheads are in major need of improved visitor information services and increased parking facilities. Priority for development is: Big Meadows, Sunset Meadow, and Stony Creek.



Rowell Meadow Trailhead (30E08) at Sunset Meadow



Rowell Meadow trailhead parking

- b.) Continued close monitoring of user conflicts and resource damage must continue. This is particularly important for those trails where concentrated recreation use is occurring by a diversity of users, i.e. hikers, equestrians and ORV enthusiasts.

- c.) Progress must continue in rerouting trails around riparian areas and the construction of rock bridges over small streams.



Rock Bridge - Rowell Meadow Trail (30E08)

- d.) The Jennie Ellis Trail (29E05) should be closed to ORV use from Fox Meadow to J.O. Pass. The J.O. Pass Trail (30E11) should likewise be closed to ORV use from J.O. Pass to the terminus with the Weaver Lake Trail (30E09). There are several reasons for this proposal:

- 1.) Use records indicate ORV use is very low on the Jennie Ellis Trail (29E05) between Fox Meadow and Poop Out Pass.
- 2.) A large boulder field located approximately 1000 feet east of Poop Out Pass within T.14S., R.29E., Section 24, is effectively limiting access to Jennie Lake and inhibiting use of the trail as a through ORV access route.



Boulder field 1000 feet east of Poop Out Pass on Jennie Ellis Trail
(29E05)

- 3.) A substantial amount of work will be necessary to avoid the boulder field. How much new construction, blasting, and relocation work is acceptable may be a sensitive issue within a RARE II and "State Suit" area.
- 4.) Most visitors go to Jennie Lake for solitude. The desire for solitude is greatest at primitive campsites and hard-to-get-to areas (Dailey and Redman, 1975). Within these areas, any noise suggesting the presence of other people will probably have a negative, intrusive, or annoying connotation. It is not the physical properties of the noise that account for the perceived annoyance; the noise itself may be barely audible. Rather, it is the meaning of the noise that makes it intrusive--people are present where they are neither desired nor expected. In a study of use patterns and visitor attitudes in nine wilderness and roadless areas, Lucas (1980) found that no question asked produced such a one-sided response as did the desirability of trail motorcycles. From 66-90 percent of the visitors felt trail bikes were "very undesirable" in the few areas where trail motorcycles were permitted. Almost the only dissenters were the motorbike riders themselves.

- 5.) A designated corridor should be provided for mechanized recreation use. It is suggested the Weaver Lake Trail (30E09) be selected as an alternate designated ORV route.

The trail would provide through access within the Shell Management Unit while minimizing user conflict. The anticipated heavy maintenance on the trail midway between Weaver Lake and the Poop Out Pass Trail (30E11) would be an ideal project for a Volunteer or "Adopt-A-Trail" program.

- e.) It is suggested that each major trailhead have a trailside registration box located a suitable distance away from the trailhead, if necessary, to prevent vandalism. Proper sign location will be the critical factor in ensuring the best registration compliance.

IV. DISPERSED RECREATION SITE DEVELOPMENT PLAN:

The following analysis and recommendations compliment the objectives set forth in Chapter One and suggest methods which can mitigate the adverse impacts of both physical and social conflicts. The preliminary field analysis was helpful in identifying which areas were receiving the heaviest amount of recreation use in addition to determining how many and what kinds of sites existed.

The heaviest recreation use is occurring at Weaver Lake with approximately eighty-five percent of visitor use centered around day use activities such as picnicking, fishing, photography, etc. Average visitor stay is approximately six hours with an additional four hours necessary for hiking to and from the lake from Big Meadows. The lake is approximately nine acres in surface size and is located at 8,720 feet elevation. Nearly all activities are concentrated on the northern half of the lake where the topography is relatively flat and easily accessible. There are seven primary and five secondary campsites. The effects of both day use and overnite camping have moderately impacted the lake and surrounding environment. Adverse impacts such as loss of vegetation cover, increase in bare ground, and exposed root structures have been caused by excessive trampling and improper campsite location. Numerous trees have been mutilated and/or removed, and lack of regeneration has become evident. Campers are encouraged to camp and build fires where they wish because there has been no plan for campsite facility development. Some visitors who desire additional solitude have

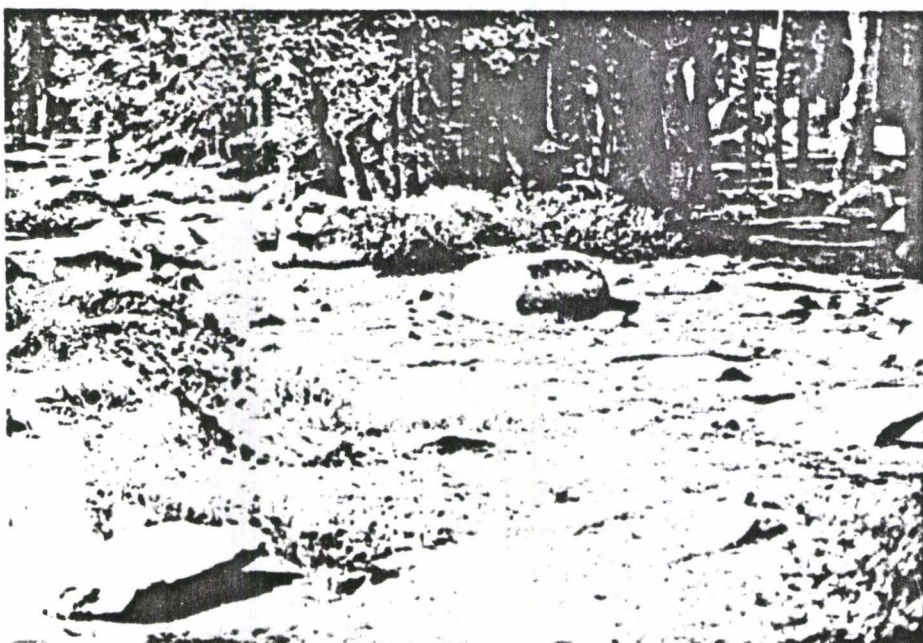
established campsites away from the lake area which have contributed to a sprawling effect and resultant adverse impact on previously undisturbed areas. Toilet facilities have a limited capacity and are improperly located. Heavy snows have severely damaged these facilities. The lakeshore environment has been moderately impacted by the continuous hiking pressure around the lake. Small accumulations of garbage and discarded camping equipment are beginning to appear.



Weaver Lake

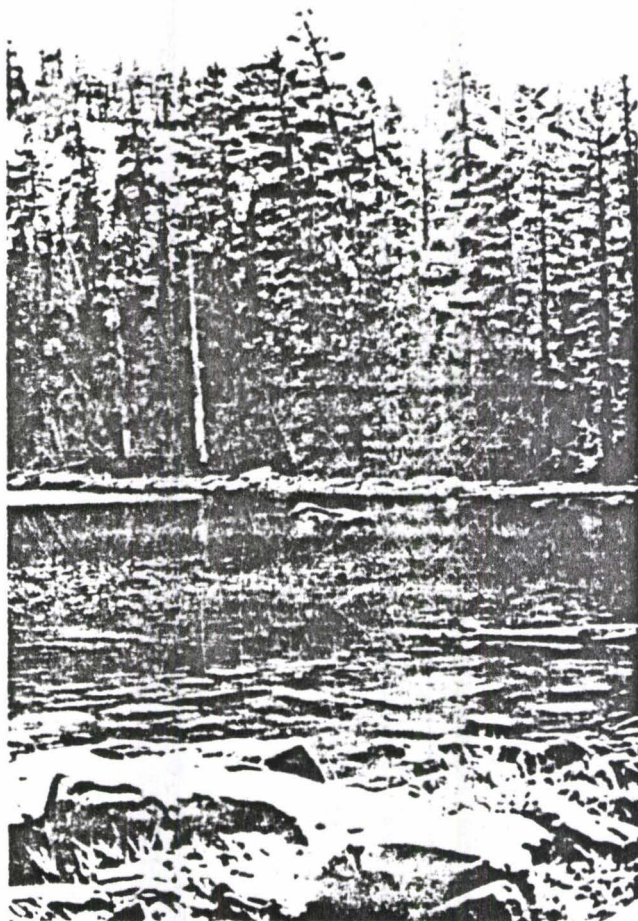


Campsite - Weaver Lake



Shoreline - Weaver Lake

Jennie Lake is receiving a moderate amount of recreation use. Visitors to the area are primarily backpackers who seek solitude and a back-country experience. The average length of stay is two days including a hike in time of four to five hours from Big Meadows. The lake is located at approximately 9,040 feet elevation and covers a surface acreage of approximately sixteen acres. There are seven primary and three secondary campsites located at the northern half of the lake. Jennie Lake is nearly identical in physical and topographic features to Weaver Lake. A rocky granitic wall rises 300 feet from the south shoreline which limits available space for camping and day use activities. Adverse resource impacts are nearly identical to Weaver Lake. Vegetation, soil cover, root structures, etc., have all been impacted by trampling, particularly at campsite locations. Restrooms are inadequate and improperly located. Solid waste problems appear to be less frequent at Jennie Lake than elsewhere in the Shell Management Unit. This is primarily attributed to a different type of user with a better backcountry ethic.



Jennie Lake



Campsite - Jennie Lake



Exposed root structures - Jennie Lake

Rowell Meadow is the third area of concentrated recreation use. The area is a primary jumping-off point for the backcountry within the Shell Management Unit and the Kings Canyon National Park. A small cabin is located at Rowell Meadow which is jointly used by the U.S. Forest Service and the National Park Service. The cabin and adjoining area serve as a staging area, spike camp, and visitor information point. Adverse resource damage within the Rowell Meadow area is considered light to moderate. It is the least severely impacted of the three areas of concentrated recreation use within the Shell Management Unit. Three primary campsites and a corral are located between the cabin and the Marvin Pass Trail (30E06). All three campsites are similar in layout and design and have sustained similar resource damage as those sites at Weaver and Jennie Lakes. Trampling in the area of the corral is particularly noticeable. The area is dotted with the scattered remains of a cabin, minor garbage accumulations, and deteriorated fencing. Toilet facilities are inadequate, improperly located, and are in need of replacement.



Rowell Meadow

In summary, all three concentrated recreation use areas have similar problems with site facilities and related adverse impacts on resources. During the past several decades, a considerable amount of research has been conducted in other areas with similar problems. The following recommendations are based in part on that research.

RECOMMENDATIONS:

Implement a dispersed recreation site development plan utilizing current state of the art research as guidelines. These recommendations are designed to compliment the previous discussion on carrying capacity and meet the stated objectives in Chapter One.

- a.) Using the Interpretive Services Plan, implement a system by which visitor dispersal can be achieved without causing additional adverse resource impacts elsewhere. Stress day use activities at Weaver Lake with limited overnight camping facilities. Emphasize Jennie Lake for backpackers who seek longer stays and increased solitude. Recommend Rowell Meadow for short one day loop-type hikes and as a jumping off point for backcountry areas within the Shell Management Unit and the Kings Canyon National Park.

- b.) Limit the number of primitive dispersed recreation campsites to:

<u>Location</u>	<u>Number Sites</u>
Weaver Lake	5
Jennie Lake	5
Rowell Meadow	3

- c.) Priority emphasis for rehabilitation of campsites will be placed on campsites which currently receive a moderate amount

of use and where resource damage will not be significantly increased. All campsites will consist of a primitive rock fireplace and picnic table utilizing native materials. Campsites to be placed not closer than 100 feet to lakes and streams. Many campsites are located on the shoreline at Weaver and Jennie Lakes. Good justifiable rationales will help convince visitors to camp away from lakeshores. The argument that mountain lakeshores are more fragile than adjacent areas is generally not tenable. Spacing between campsites to be not closer than 200 feet with maximum utilization of physical and topographic features to reduce noise and provide visual screening. All secondary and/or improperly located campsites to be removed.

- d.) Equestrian use to be prohibited within 300 feet of Weaver and Jennie Lakes. No additional equestrian facilities to be constructed. Use of corral at Rowell Meadow and holding pens at Big Meadows to continue.
- e.) Rehabilitate primitive restroom facilities at Weaver and Jennie Lakes and Rowell Meadow.
- f.) Heavy emphasis on "No Trace Camping" and "Pack In - Pack Out" concepts.

g.) Prohibit organized group use at Weaver and Jennie Lake by parties in excess of ten persons.

h.) Prohibit ORV use within 300 feet of Weaver and Jennie Lakes.

CHAPTER V

SUMMARY AND CONCLUSIONS

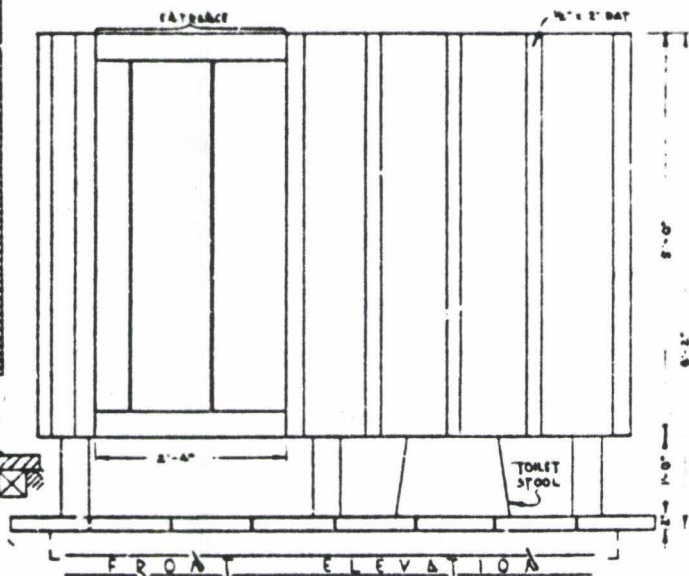
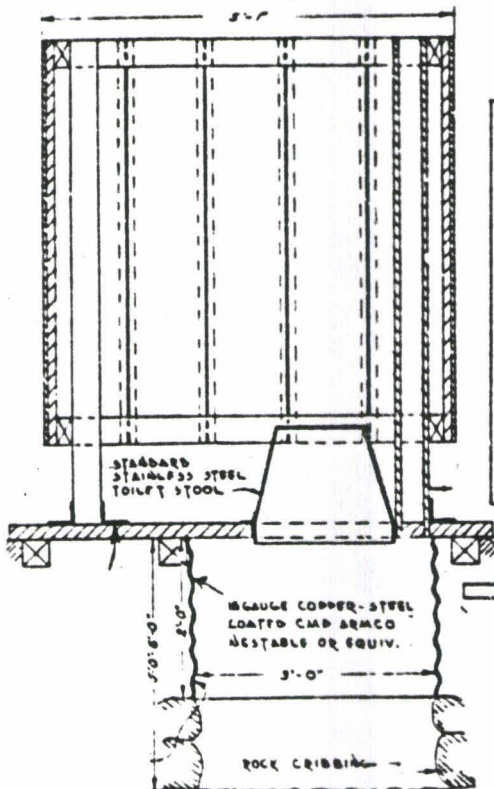
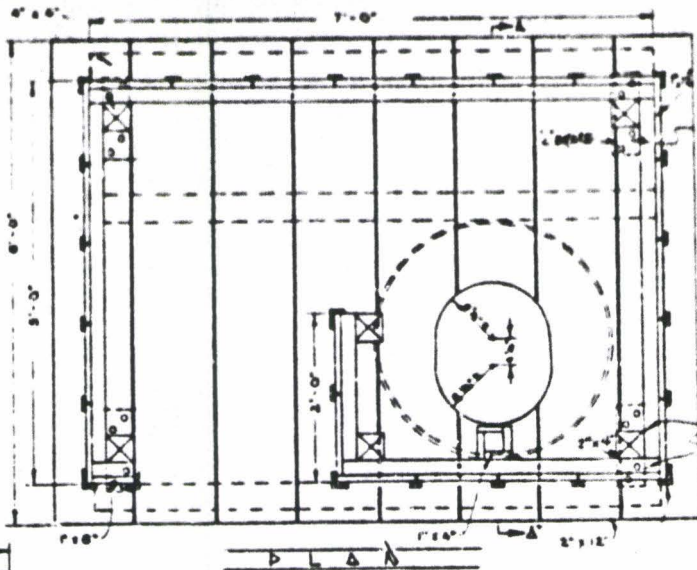
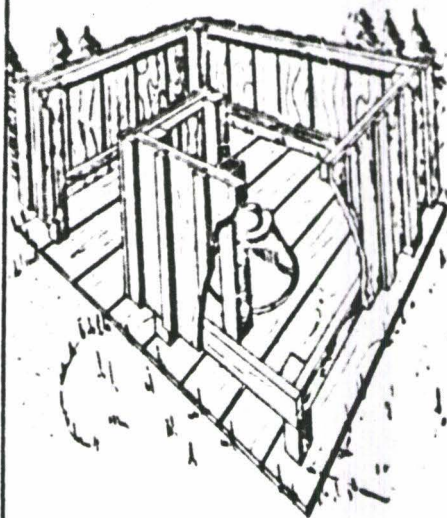
I. INTRODUCTION:

Current management of the Shell Management Unit can be improved by intensified efforts in interpretive services, trail management, and dispersed recreation site development.

Relatively easy access to the area by visitors, pack stock enthusiasts, and two-wheeled vehicles has increased user conflict, accelerated resource impacts, adversely impacted facilities, and deteriorated the quality of the recreation experience. Visitor trends, usage, and carrying capacities need to be better defined and analyzed.

The focus of the study is the 9,290 acre Shell Management Unit located within the Hume Lake Ranger District of the Sequoia National Forest. The unit lies directly adjacent to the Kings Canyon National Park, which makes overall planning, coordination and management critical. Emphasis of the study is directed toward those areas within the Unit where concentrated recreation use is occurring.

This chapter will briefly summarize the procedures, findings, and conclusions of the study. Implications of the study will also be discussed with related recommendations for future management of the Unit in addition to providing input to the Forest Land Management Plan.



■ DETAILS NOT
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BACK COUNTRY TOILETS

APPROVED: JUNE 61
FOREST SERVICE CALIFORNIA REGION

II. SUMMARY OF PROCEDURES AND FINDINGS:

The study is based on literature within the context of the Forest Service Manual and related Handbooks. Two subsequent literature searches were conducted by WESTFORNET, which resulted in sixty bibliographic references. Review of these references provided the necessary information in formulating recommendations in the study.

Review of literature relating to Interpretive Services revealed management goals for dispersed recreation areas can often be attained by advising visitors early in the recreation experience of trail and backcountry conditions and facilities available. The study recommends placement of bulletin boards and brochures at all major trailheads to inform visitors of various recreation opportunities and facilities available and equipment and skills appropriate for the backcountry. Visitor dispersal will be encouraged by recommending alternative areas and activities detached from concentrated public use sites. Additional emphasis will be placed on "Pack In - Pack Out" and "No-Trace Camping".

Trail management recommendations include the elimination of the Jennie Ellis Trail (29E05) and J.O. Pass Trail (30E11) as designated ORV routes. As an alternative, it is suggested the Weaver Lake Trail (30E09) be utilized for access by ORV's to backcountry areas within the Shell Management Unit. Site specific recom-

mendations for the nine trails within the unit are discussed in further detail in Chapter Four. In summary, these trails are in need of constructed trailhead facilities, realignment due to improper location with resultant resource damage, and construction of rock bridges.

Dispersed recreation site development recommendations include the rehabilitation of thirteen existing campsites at Weaver (5), Jennie (5), and Rowell Meadow (3). Recommendations for lake campsites include a 100 foot setback from the lakeshore and 200 foot spacing between campsites. Primitive fireplaces and picnic tables will be installed at each site. All remaining campsites to be removed. Relocate and install new primitive toilet facilities at Weaver and Jennie Lakes and Rowell Meadow. Prohibit equestrian and ORV use within 300 feet of Weaver and Jennie Lakes.

III. CONCLUSIONS:

Based upon the recommendations and within the limitations of this study, it is concluded that past research will be of substantial assistance in development and implementation of dispersed area recreation management plans. The problems confronting the Shell Management Unit are not unique and past research can identify potential conflicts as well as recommend measures to mitigate adverse resource impacts.

As a result of this research, it is concluded that an Interpretive Services Plan can be instrumental in meeting management objectives if delivered to the visitor before entering the area. A properly implemented Plan will provide redistribution of visitor use, reduce administrative cost, and provide timely and accurate information for both management and the visitor. Resource impacts can be limited by stressing "Pack In - Pack Out" and "No-Trace Camping".

Several important conclusions are made from recommendations presented in the Trail Management Plan. Use should be concentrated on designated trails. Damage increases with increasing slope, tall shrub or forb vegetation, and soil water content. Impacts of both horses and motorcycles are significantly greater than those of hikers with respect to physical damage. Transportation carrying capacity may have to be allocated according to

the reciprocal of damage done by each mode of transport. Since hikers and horses tend to be more destructive when moving down-slope, traffic should be directed, where feasible, so steep slopes are ascended and gentle slopes are descended. For motorcycles the opposite is true.

The quality of the backcountry recreation experience can be enhanced by dispersed recreation site development. Site alteration can be effectively reduced by concentrating visitors on resistant sites and by modifying visitor behavior and the type of use a site receives. Reduced camping on heavily used sites will do little to decrease site alteration. Campsites in good condition often receive more use than those in poor condition. Meadow vegetation is usually less severely disturbed by camping than the understory plants in adjacent forests. Lakeshore campsites are no more fragile than adjacent forested areas. Sociological implications may warrant setbacks based on excessive noise, esthetics, overcrowding, and denied access to the lake. There is little evidence of human health hazards associated with heavy use of backcountry lakes; however, the installation of primitive toilets is considered appropriate. It is especially important that a perception of solitude be enhanced and complimented by the number and type of dispersed recreation sites developed.

IV. DISCUSSION AND IMPLEMENTATION:

Previous research has benefited this study substantially due to its direct applicability to related problems under similar field conditions. The implications of carrying capacity and visitor use on available resources is often a complex and controversial issue. How much wear and tear of the resources should the manager permit before the decision is made "that's enough?" Management objectives for the Shell Management Unit stress retention of a natural or near-natural setting; however, we immediately compromise that goal by simply allowing use of the location. The alternative is closure which is neither acceptable nor enforceable.

This study recommends a preferred alternative of concentrating recreation use on a limited number of existing trails and campsites where excessive adverse resource impacts will not occur. A fine line has been drawn between providing a sufficient number of campsites and not encouraging visitor sprawl with resultant additional resource damage. It is felt the number of allocated campsites at Weaver and Jennie Lakes and Rowell Meadow adequately responds to a reasonable carrying capacity which compliments the objectives set forth in Chapter One. The Interpretive Services Plan can be of substantial benefit in implementing the study recommendations through accurate and timely information provided to visitors regarding recreation opportunities and available

facilities. Concurrently, the same information can be utilized to management's benefit by recommending alternative sites and activities which compliment acceptable visitor dispersal.

The study has contributed significantly in helping to understand the complexities of carrying capacity and the impacts caused by various user groups and types of activities and can provide management with suitable alternatives and methods which can help identify and mitigate adverse resource impacts. This study will be used in the evaluation and management of other dispersed recreation areas within the Hume Lake District.

V. RECOMMENDATIONS:

This study has researched and analyzed recreation resource management problems inherent within the Shell Management Unit with recommendations for corrective action. Final plans are now being made to utilize Human Resource Program and California Conservation Corps personnel in implementing the recommendations set forth in the Interpretive Services Plan in Chapter Four. Priority emphasis for visitor information points (listed in order) are: Big Meadows, Sunset Meadow, and Stony Creek trailheads. By June 1st, bulletin boards will be installed and brochures available on "Pack In - Pack Out" and "No Trace Camping" and area regulations. Additional brochures and maps will be developed this field season which discuss recreation opportunities, features, facilities, trail system layout, and camping and backcountry skills. This information is not expected to be available until the 1984 field season due to necessary lead time and approvals.

By June 15th, a trail crew will begin working major trails to Weaver and Jennie Lakes and Rowell Meadow. Site specific recommendations for each trail were previously discussed in Chapter Four. Trail Logs and Condition Survey Reports will be revised and updated as necessary to reflect current field conditions. Continued emphasis will be given to health and

safety hazards, correction of facility and resource damage, and continued documentation of user conflicts. Rerouting short segments of trail and construction of rock bridges will be deferred until mid August when stream runoff is minimized.

An environmental assessment, on-site analyses, and site development plans will be completed by July 1st. Priority emphasis for rehabilitation of campsites will be placed on those campsites which have received a moderate amount of use and where resource damage will not be significantly increased. Campsites will consist of primitive rock fireplaces and picnic tables utilizing native materials. Spacing between campsites will be a minimum 200 feet with a 100 foot setback from lakes and streams. These standards meet the best mix of retaining the environmental integrity of the Unit while at the same time providing a diverse spectrum of recreation opportunities.

During July and August, a ten person California Conservation Corps crew will begin rehabilitation work at Weaver Lake on five campsites and one primitive restroom. The work is expected to be one week in duration. The crew will then move up to Jennie Lake where five campsites and one primitive restroom are scheduled for similar work. The remaining three campsites and a primitive

restroom at Rowell Meadow will be completed by mid-August. Once the campsites and restroom rehabilitation work is completed, the crew will be ideally positioned to commence trail relocation work and installation of rock bridges throughout the remainder of the Shell Management Unit.

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APPENDICES

- A. Hume Project Prospectus Outline
- B. Brochure: Evaluating Your No-Trace Camping Experience
- C. Brochure: Are You A Good Camping Neighbor?
- D. Brochure: Without A Trace
- E. Wildlife Biologist's Input To Plan
- F. Backcountry Toilet Design

APPENDIX A

Home Project Prospectus Outline

HOME PROJECT PROSPECTUS OUTLINE

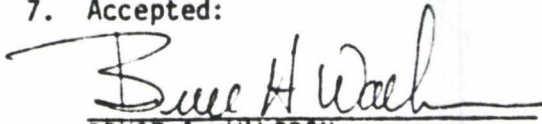
1. Cover Page: Bruce E. Giampaoli
Recreation Staff Officer
Hume Lake Ranger District
36273 E. Kings Canyon Road
Dunlap, CA 93621
(209) 338-2251
2. Title: Recreation Management Plan for Shell
Management Unit
3. Sign-off Page: Bruce A. Waldron
District Ranger
Hume Lake Ranger District
Sequoia National Forest
4. Description of Audience: The Management Plan will be written primarily for the use of the District Ranger and Staff to assist in current management, long range planning and facility development. The plan is also intended to provide general guidance to field personnel concerning trail management, improvements to dispersed recreation sites, potential user conflicts and protection of resources.
5. Statement of the Problem: Recreation Resources within the Shell Management Unit can be improved by intensified efforts in the development of dispersed recreation sites, trail management and interpretive services. Relatively easy access to the area by visitors, pack stock enthusiasts and trail bike users has encouraged user conflict, accelerated resource damage, adversely impacted facilities and deteriorated the quality of the recreation experience. Visitor trends, usage and carrying capacities need to be better defined and analyzed. The entire east and south sides of the Management Unit lies adjacent to the Kings Canyon National Park which makes overall planning, management and coordination critical.

6. Objectives:

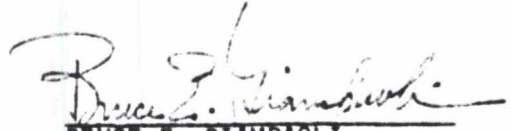
- a. Define areas of concentrated public use with related proposals for the development of dispersed recreation sites based on carrying capacity.
- b. Development of a Trail Management Plan.
- c. Development of an Interpretive Services Plan.

These objectives are designed to compliment each other with primary emphasis on long range planning and development of recreation resources within the Shell Management Unit.

7. Accepted:



BRUCE A. WALDRON
District Ranger



BRUCE E. GIAMPAOLI
Recreation Staff Officer

APPENDIX B

Brochure: Evaluating Your No-Trace Camping Experience

Evaluating Your No-Trace Camping Experience



United States
Department of
Agriculture

**Forest
Service**

**Pacific
Northwest
Region**

APPENDIX C

Brochure: Are You A Good Camping Neighbor?

APPENDIX D

Brochure: Without A Trace

are
YOU
a
good
camping
neighbor
?



FOREST SERVICE · USDA
Pacific Northwest Region

WITHOUT A TRACE

the Wilderness Challenge



Forest Service · USDA
Pacific Northwest Region

APPENDIX E

Wildlife Biologist's Input To Plan

11/19/82

Subject: Shell Recreation Management Unit; Wildlife Concerns

To: Bruce Giampaoli, Recreation Officer

We have already discussed the effects on wildlife of recreationists in the Shell Management Unit, but I wanted to write my thoughts down for our records.

1. The major disturbance to wildlife is caused by the noise and speed of people on motorcycles. Wildlife will be displaced from areas near trails used by motorcyclists.
2. Backpackers hiking through an area have very little affect on wildlife.
3. Concerns with camping around Jenny and Weaver Lakes:
 - A. Noise disturbance
 - B. Limited access to lake by animals.

We have discussed the edge of Jenny Lake between the incoming and outgoing streams. This area is too steep and rocky for campers. It is well vegetated and provides an excellent access for wildlife to visit the lake. A similiar portion of the shore of Weaver Lake (approx. 200 yards and well vegetated) should be excluded from camper use for wildlife access.

Suggestions for recreationists orientation and education handout:

1. Pack it in, pack it out.
2. Burn food garbage, do not throw it out on the ground for the animals. If animals become accustomed to human-provided food they will become a nuisance in the camping area and they may also become dependant on that food source.
3. Encourage motorcyclists to be aware of and considerate of the wildlife. Prohibit off-trail riding.
4. Do not return water used for dishwashing, etc. to the lake.

Janet Zwanziger
JANET ZWANZIGER
Wildlife Biologist

APPENDIX F

Backcountry Toilet Design